

Title

To share or not to share? Motivation (mis)alignments in knowledge sharing in multisectoral cooperation for grand challenges

Author

Carla Sacchi, Department of Business Studies, Uppsala University (Sweden)

carla.sacchi@fek.uu.se

To share or not to share? Motivation (mis)alignments in knowledge sharing in multisectoral cooperation for grand challenges

Abstract

Knowledge sharing is key to the functioning of multisectoral partnerships, which are becoming essential to tackle grand challenges, such as antibiotic resistance, where interdisciplinary global problems affect multiple stakeholders. As multinational corporations (MNCs) are increasingly engaged in multisectoral partnerships, this paper asks what factors affect knowledge sharing between MNCs and other partners in a multisectoral partnership for the grand challenge of antibiotic resistance. A contextualized single-case study of a Swedish multisectoral partnership for antibiotic innovation is analysed. With a microfoundations approach, the study finds that some structural and individual elements of the partnership, such as transparent communication and leadership, can facilitate the knowledge sharing, while others, such as fear and conflicts, may hinder it. The study offers two main theoretical contribution, by both shedding light on the phenomenon of knowledge sharing in such a new context, and by showing how a microfoundations approach is particularly useful to disentangle its complexity.

Keywords:

Knowledge sharing – Multi-stakeholder cooperation – Multisectoral partnerships – Multinational Corporations – Complexity – Microfoundations – Grand challenges

Word count: 8,092

Short premise

As my work on this Developmental paper is ongoing, I would like you to consider the updated title as: “Microfoundations of knowledge sharing: MNCs in a multisectoral partnership for a grand challenge”. Thanks to the useful comments of two anonymous reviewers, I have been rewriting some parts of this paper and present here an updated version. The findings and the discussion are still at an initial stage, but I welcome any suggestion and comment to further develop them.

Introduction

Knowledge sharing is key to the functioning of multinational corporations (MNCs), and it is considered one of the critical elements of MNCs’ cooperating in partnerships. It has been studied by literature streams focusing on both inter-firm and multisectoral cooperative relationships (MacDonald, Clarke, & Huang, 2019; Murphy, Perrot, & Rivera-Santos, 2012; Selsky & Parker, 2005). Since partnerships require the existence of a common problem that affects different actors, knowledge sharing is aimed at “learning new ways of framing the problem and potential solutions” (Selsky & Parker, 2005, p. 864) and it may result from understanding different approaches to the common problem, and from integrating different sources of knowledge (Murphy et al., 2012). Thus, knowledge sharing in a multisectoral context is complex in that it involves interactions between MNCs and partners of different natures (Murphy et al., 2012).

MNCs are increasingly involved in multisectoral partnerships in the face of grand challenges, i.e., multifaceted and complex issues that burden the society and the environment globally, such as climate change and antibiotic resistance (Buckley, Doh, & Benischke, 2017; Fernhaber & Zou, 2022). Indeed, responding to these grand challenges is highly complex (Dentoni, Bitzer, & Pascucci, 2016; MacDonald et al., 2019) and it requires that MNCs cooperate with actors from other sectors, such as public authorities and research institutions, to develop innovative solutions (Oh & Oetzel, 2022), as these challenges are “spilling over the traditional boundaries” of a single actor (Selsky & Parker, 2005, p. 851). As MNCs are commonly assumed to make decisions based on principles of profitability and efficiency, grand challenges pose a question about the role of business firms in the society and their potential contribution to its problems. Indeed, the participation of MNCs in multisectoral partnerships can be regarded as a new empirical setting for their action, where MNCs’ behaviour is directly affecting and being affected by different types of stakeholders, and thus it is highly relevant for international business (IB) research (Reuber, Alkhaled, Barnard, Couper, & Sasaki, 2022).

As a consequence, it is important to study why MNCs, such as pharmaceutical companies in the antibiotics market, decide to cooperate with other companies and actors from other sectors and thus to share knowledge despite the obstacles they face, and how this sharing happens in the cooperation. Therefore, in order to contribute to understanding the role of MNCs knowledge sharing in the context of multisectoral partnerships for grand challenges, I employ a microfoundations approach (e.g., Felin et al., 2012) to analyse the interactions among the different levels, the processes and the structure of the multisectoral partnership that allow or hinder knowledge sharing. A microfoundations approach follows the tenets of behavioural theory as it assumes that the actions and capabilities of firms depend on the individuals’ actions and capabilities, and that these micro-level elements are essential to understand and explain upper-level processes (Coviello, Kano, & Liesch, 2017; Felin et al., 2012). Such a framing has been already applied to investigate similar phenomena, such as to analyse the microfoundations

of learning in the context of inter-firm cooperation (Park & Harris, 2014) and knowledge sharing in the MNC (Foss & Pedersen, 2019). By employing this approach, I assume that analysing the structure of the partnership, the processes ongoing at the level of the individuals working within the partnership, and their interactions, can contribute to a deeper understanding of the knowledge sharing between the MNCs and the other partners. Therefore, this study replies to the following research question:

What factors affect knowledge sharing between MNCs and other partners in a multisectoral partnership for the grand challenge of antibiotic resistance?

I build a contextualized single-case study to explore the phenomenon of knowledge sharing between MNCs from the pharmaceutical industry and partners from other sectors involved in a multisectoral partnership for antibiotic innovation. Such partnership is based in Sweden, and it is aimed at innovating the market of antibiotics, affected by the grand challenge of antibiotic resistance. Qualitative data from interviews, observation, and secondary sources were collected over nine months, and analysed with thematic analysis in particular by means of coding, narratives, and visual maps (Ghauri, 2004; Huberman & Miles, 1983).

The findings from the empirical case describe how the knowledge sharing unfolds within the partnership. Such process is enabled by work division and collaborative activities that allow for individual learning, but often challenged by fear of the individual participants, unpredictability of the matter, and divergences in professional opinions (interaction between individual and process microfoundations). At the individual level, leadership is found to play an important role in guiding the knowledge sharing among participants from different sectors and companies, as well as the motivations of the individual participants both from a professional and an altruistic or civic perspective. At the structural level, key elements are clear rules for communication, transparency and the alignment between the partnership overall goals and the partners' motivations to share knowledge. Thus, the interaction between the individual and structure microfoundations leads to trust building among the participants, while the interactions between structure and process microfoundations allows to overcome the complexity of knowledge sharing, ultimately driving forwards both tangible and intangible results for the partnership.

The study has two main theoretical contributions. Firstly, it sheds light on the elements that enable or hinder MNCs knowledge sharing in multisectoral partnerships for a grand challenge, contributing to the literature on such an emerging theme (e.g., Buckley et al., 2017). Secondly, it shows how a microfoundations approach is particularly useful to disentangle the complexity of this empirical phenomenon, thus expanding the applicability of such framework to knowledge sharing in multisectoral cooperative relationships.

The study also offers some empirical contributions for practice and policy-making (Aguinis, Bergh, & Molina-Azorin, 2023), by highlighting how different elements of the structure and processes of the partnership affect its functioning, and which features at the individual level play an important role in the knowledge sharing, ultimately suggesting how existing multisectoral partnerships could leverage such elements to better achieve their goals.

The remaining of this article is organized as follows. First, I provide a brief overview of the grand challenge of antibiotic resistance as the empirical context of the study. I then summarize the received literature on multisectoral partnerships for grand challenges, knowledge sharing and its motivations in this context. In the methods section, I present my overall research design, briefly introduce the microfoundations approach and how I am applying it in my data collection and analysis. Finally, the main findings are reported according to the different themes and

microfoundations elements, and then discussed to eventually identify some key contributions to literature and practice.

Background

Empirical context: antibiotic resistance

The grand challenge of antibiotic resistance (ABR) is a complex phenomenon that embeds public health, environmental, scientific, financial, legal and business issues, which are intertwined and cannot be addressed separately – although below I try to present them by discipline. Thus, ABR sadly qualifies for being interdisciplinary in nature, which is one of the four attributes of grand challenges identified by Buckley et al. (Buckley et al., 2017).

From a public health perspective, antibiotics and, more generally, antimicrobial drugs constitute one of the pillars of modern medicine by targeting and killing bacteria: not only are they essential for treating infectious diseases, but also for carrying out routine procedures and surgeries (e.g., giving birth or teeth removal), and advanced hospital treatments (e.g., cancer therapy). However, thanks to natural selection, over time some bacteria treated with antibiotics learn how to survive and become resistant (WHO, 2020). ABR makes antibiotics no longer effective and constitutes a threat to global health (ECDC, 2022), since several of the bacteria causing infectious diseases have become resistant to one or more antibiotics¹ (OECD, 2018). Therefore, ABR forces physicians to make difficult treatment decisions: to what extent should they prescribe antibiotics to cure current patients, instead of waiting to see if such patients can fight bacteria on their own, thus saving antibiotics to the future benefit of others? In addition, diagnostic tools to identify the exact bacteria causing infections in any given patient are usually expensive and time consuming, and so physicians often prefer to prescribe “broad spectrum” antibiotics (i.e., targeting larger groups of bacteria) instead of “narrow spectrum” ones (i.e., targeting specific bacteria). The consequence of such misuse further favours the spread of ABR.

Secondly, the environment plays a key role in the spread of resistant bacteria, which move across humans and animals via direct contact, water, food production and consumption (WHO, 2020). Because of the frequent movements of people across the globe, and of the misuse of antibiotics both in humans and animals (Tang et al., 2017), ABR has been accelerated in the last decades, and it has spread globally at unprecedented rates (Sriram, Kalanxhi, Kapoor, & et al., 2021).

Moreover, research and development (R&D) of new antibiotics presents higher levels of scientific difficulty compared to other drugs (Wellcome Trust, 2021): as existing antibiotics lose efficacy, no new ones are available. After the last new class of antibiotics was discovered in 1987, there came an era of “antibiotic void” (Silver, 2011). More scientific evidence is also needed to improve the use of existing antibiotics, for example in order to develop better clinical guidelines and optimize the current recommended doses, as well as for developing cost-effective and efficient diagnostic tools that could be adopted by health care providers.

As a consequence of the scientific complexity of antibiotic R&D, its costs have increased sharply, while at the same time ABR has dramatically shortened the expected lifespan of any given antibiotic, undermining their economic value. This has resulted in most pharmaceutical companies abandoning such activities and thus in the decline of antibiotic innovation

¹ These multi-drug-resistant bacteria are often called “super-bugs”, i.e., bacteria strong enough to survive and resist to multiple antibiotic treatments.

(Ciabuschi & Lindahl, 2018). In facts, since market prices of antibiotics are generally very low, their financial profitability has collapsed.

The legal context poses further challenges to the situation, in that a high level of secrecy is generally imposed on the pharmaceutical industry because of antitrust regulations. Additionally, in some countries, such as Sweden, patients' protection laws heavily regulate the interactions between pharmaceutical companies, the payers of pharmaceutical products (i.e., public authorities) and the drugs prescribers (i.e., physicians). The goal of such regulations is to preserve the independence of the different decision makers involved in the approval and adoption of such delicate products as medicines, but they also hinder the communication among parties that in special cases would need to cooperate to face common issues.

Finally, ABR also causes problems with regards to the production and distribution of existing antibiotics. As the market demand for narrow-spectrum antibiotics is small in terms of size, companies are often withdrawing them from the market as even their continued production or distribution is no longer profitable. Such issues are inflated in smaller countries, such as Sweden, where the volumes of sales are almost negligible for large MNCs, but the consequences for specific patient groups and the overall levels of AMR are disastrous.

Thus, the necessary antibiotic innovation seems to be achievable only through interdisciplinary partnerships (Wellcome Trust, 2021; Wright, 2016; Zorzet, 2014), where knowledge is shared by partners active in different fields. No discipline can alone find a solution, but all can cooperate towards the creation of a more sustainable system for both antibiotic use and R&D.

Multisectoral partnerships for grand challenges

Analysing multisectoral cooperation can be considered of high relevance for IB literature in that it expands the traditional concept of strategic alliances. Given the low expected profits and high costs of antibiotic R&D, traditional business alliances in this field are not viable, differently from what happens in other pharmaceutical fields, such as biotechnology networks (Baraldi & Strömsten, 2009) or R&D alliances (Narula & Dunning, 1998). In addition, as explained above, it is essential that a multidisciplinary effort is embraced by partners belonging to multiple sectors. Thus, the distance between the MNCs and other actors involved in the partnership becomes the main feature of interest for IB scholarship looking at this phenomenon: even within national borders, how can MNCs interact and share knowledge with others that would usually be considered only as business partners, regulators, or users?

Multisectoral cooperation involving MNCs may be formalized by different types of arrangements. Among the terms used by extant literature to call these arrangements we find: multisectoral (Ciabuschi, Baraldi, & Lindahl, 2020) or cross-sector (Dentoni et al., 2016; Ritvala, Salmi, & Andersson, 2014; van Zanten & van Tulder, 2018) partnerships, cross-sector alliances (Murphy et al., 2012), or multistakeholder partnerships (Gray & Purdy, 2018; MacDonald et al., 2019). All these terms share the idea that firms cooperating with actors from other sectors are moved by more than simple "firm-centric goals" (le Ber & Branzei, 2010), but aim at creating some common benefits or social value. In this study, I will refer to them as "multisectoral partnerships" (MSPs).

The creation of social benefits or value is becoming increasingly important because some problems are growing so much to be referred to as "grand" or "global" challenges. These challenges can be defined as problems without a technical solution, i.e., a solution that comes from the "techniques of the natural sciences" (Hardin, 1968, p. 1243), while demanding changes in individual and societal behaviours, values and morality (George, Howard-Grenville, Joshi, & Tihanyi, 2016; Hardin, 1968). Indeed, such problems are related to the concept of common good, and thus call upon a re-evaluation of those areas that were left to the decisions

of the free market, and are now in need of coordinated decisions and shared rules to stop or reverse the ongoing value loss (Hardin, 1968). As MNCs are key players in such free market and global economy, some researchers have argued that IB research can contribute to understanding and solving these grand challenges, while expanding existing theories and broadening its scope (Buckley et al., 2017). Other suggested that IB research could analyse the expanding role of firms in sustainable development, i.e., how firms can support public actors to face grand challenges (van Zanten & van Tulder, 2018).

Knowledge sharing in multisectoral partnerships

Knowledge sharing is considered one of the critical elements of cooperating in partnerships. Business literature has abundantly studied various processes related to knowledge both within and across firms (e.g., Kogut & Zander, 1993), considering knowledge one of the key resources of firms. Among them, knowledge sharing can be distinguished from knowledge transfer, as the latter indicates the distinct movement of knowledge from a sender to a receiver, and from knowledge diffusion, i.e., a gradual process of dissemination (Szulanski, 1996). Knowledge sharing is mostly used by scholars analysing the connections among more than two units or actors (Hansen, 1999), and thus it emphasizes the relational dimension of the sharing process (Kalling & Styhre, 2003).

As a consequence, the nature of the actors involved in the knowledge sharing, as well as the context, play an important role in the sharing process itself. Thus, I argue that knowledge sharing varies between multisectoral relationships, and intra- or inter-firm relationships because of three main reasons, detailed hereafter.

First of all, partners in MSPs are different in nature and have much less in common than partners in inter-firm cooperation (Murphy et al., 2012). They have “mismatched norms and values” (MacDonald et al., 2019, p. 414), fundamentally different goals, dominant logics, governance structures and approaches (Murphy et al., 2012; Selsky & Parker, 2005). These differences add up to some solid barriers to reciprocal understanding and knowledge sharing within MSPs, which may be harder to pass than the usual barriers in inter-firm or intra-firm learning processes. Specifically, the different capabilities of the partners affect their ability to collect benefits from the cooperation, in particular their ability to learn and innovate.

Secondly, given their different goals, partners from different sectors do not share the same intrinsic motivations to join the partnership and share knowledge. Despite the main reason for cooperating can be considered the same as in inter-firm partnerships in its most basic definition, i.e., partners forego immediate benefits to gain longer-term advantages (Buckley & Casson, 1988), the specific advantages that the partners aim at reaching may vary substantially across sectors. Therefore, there might be some misalignments in the motivations of the different partners, which may affect the cooperative dynamics and the knowledge sharing itself.

Thirdly, inter-firm cooperation is typically embodied by dual relationships, while multisectoral partnerships for grand challenges involve multiple actors. Since often MSPs are created to bridge together a large number of actors (Selsky & Parker, 2005; Westley & Vredenburg, 1991), especially when working on grand challenges, this is found to negatively affect partnership capacity (MacDonald et al., 2019). Thus, it is important to understand what facilitates the knowledge sharing especially in those cases when numerous participation is desirable for the objectives of the partnerships itself.

Given the above, knowledge sharing in multisectoral partnerships is more complex than in intra- or inter-firm relationships (Gray & Purdy, 2018). Partners need to build relationships of trust and develop a common basis of knowledge, before being able to share knowledge, learn from each other and move towards the goals of the partnership (Murphy et al., 2012).

Motivations to knowledge sharing

Considering the different factors that affect knowledge sharing in the context of multisectoral partnerships, motivations to share knowledge are assumed to affect the sharing process itself and its outcomes, and they can be identified at the different levels of the individuals, the firms or other actors, and the partnership. In the context of multisectoral partnerships, the motivations at the partnership level can be defined as the explicit goal of the partnership. Regarding the other two levels, a short review of extant literature on motivations to knowledge sharing in intra-firm relationships is proposed.

Considering the firm level, a recent review (Fortwengel et al., 2023) has identified how two separate streams of literature conceive the role of motivations to knowledge sharing within the MNC. On the one side, the literature on dynamic capabilities has identified the business strategy of the firm as the main reason to knowledge sharing (Fortwengel et al., 2023). In this view, knowledge sharing is thus conceived as ancillary to building and defending the competitive advantage of the firm (Kogut & Zander, 1993). On the other side, the relational literature stream, that focuses on social capital, networks and human resource management, has found that trust, commitment, and identification are important factors of firms' motivations to transfer knowledge (Haas & Cummings, 2015). Thus, this view emphasizes the importance of the individual level, in that motivations of the individuals involved in the knowledge sharing processes contribute to those constructs at an aggregated level.

In some literature streams, individual motivations are identified as one of the key determinants of knowledge sharing, as they affect the behaviour of senders and receivers of knowledge, and thus the performance of the process (Mäkelä, Andersson, & Seppälä, 2012; Minbaeva, 2007). The importance of individual motivations is highlighted by the research on employees' rewards and incentives as useful tools for knowledge management within companies (Argote, McEvily, & Reagans, 2003). However, research on learning and absorptive capacity has pointed out that individual motivations are multifaceted, especially in more complex contexts, and thus should not be treated as a unitary concept but inclusive of different types, such as intrinsic and extrinsic motivations (Yildiz, Murtic, Zander, & Richtné, 2019).

Overall, more evidence is needed to better understand and explain the interconnections among the motivations at the different levels, and how potential misalignments in such motivations affect the knowledge sharing in the context of multisectoral partnerships.

Methods

Research design

This research study is phenomenon-based, i.e., it starts enquiring about “a contemporary, real-world phenomenon” and later “identifies a theory or set of theories that can inform that reality” (Doh, 2015, p. 609). The context is considered as an essential set of factors contributing to the phenomenon, and thus the source of potential explanations (Welch, Piekkari, Plakoyiannaki, & Paavilainen-Mäntymäki, 2011). Thus, I started from the empirical setting of the antibiotic market in Sweden and from the grand challenge of ABR, with a general research question about the role of MNCs and knowledge in MSPs. While I was collecting the data, I started identifying some general themes regarding knowledge sharing that were recurrent in the interviews and in my observations, and after collecting the data, I went back to the literature to explore specifically these themes in the context of multisectoral partnerships. Having identified the microfoundations approach as a valid and useful framework to investigate my data, I analyzed them accordingly, moving back and forth between theoretical themes and the empirical data.

Overall, an open-ended inquiry approach (Edmondson & Mc Manus, 2007) allowed to explore the nascent theory surrounding the empirical phenomenon, i.e., knowledge sharing between MNCs from the pharmaceutical industry and partners from other sectors involved in a multisectoral partnership for antibiotic innovation. Thus, a methodological fit was achieved through interviews and observation for data collection, and then the use of thematic analysis (Edmondson & Mc Manus, 2007).

Given the complexity and the novelty of the empirical phenomenon, the case study design is deemed as suitable to develop a rich and in-depth investigation (Siggelkow, 2007), to explore the explanatory connections between the different levels and interacting events happening in the empirical world (Aguinis et al., 2023). Qualitative methods are also considered suitable for analyzing phenomena that “unfold over time in context” (Doz, 2011; Reuber et al., 2022). On the backdrop of the empirical case of a Swedish MSP in the antibiotic market, I identify the theoretical case as MNCs participating in knowledge sharing in a multisectoral partnership (Reuber et al., 2022). Thus, the case was purposefully selected because of its empirical relevance and rarity, as well as its potentially interesting theoretical framing.

The study timeline extends over a period of nine months, as the data collection started in September 2022 and ended in May 2023. This allowed for collecting real-time data only on a limited portion of the life of the empirical case, which started in 2017 and is expected to end in 2026. However, data regarding the first years of the partnership were collected with retrospective interviews and secondary sources, thus allowing an understanding of the history of the partnership, and deeper contextualization.

Microfoundations approach

An increased engagement of the microfoundations approach, among others, is called for by some IB scholars (e.g., Buckley et al., 2017; Fortwengel et al., 2023) in order to make sense of the increased complexity of the world and its grand challenges, by identifying the links between individuals, firms, and aggregated levels in business processes. More specifically, micro-foundational approaches involve methodological tools that allow the researcher to move across levels while focusing on the interactions between them (Aguinis et al., 2023).

Microfoundations approaches are commonly used to describe organizational phenomena (Coviello et al., 2017; Felin et al., 2012; Foss & Pedersen, 2019), where individuals are employees and managers of a given company. Structures and processes are then developed at team, department, and higher hierarchical levels, to finally reach the aggregated level of the whole company. However, applications in other contexts have also been successful, such as to study the case of joint ventures, where individuals come from the different companies that form the joint venture (e.g., Park & Harris, 2014). Specifically, Park and Harris were able to graphically represent (Figure 1) the core principles of microfoundations in a non-deterministic way, but by taking into account the complexity of its interacting elements.

Following such an approach, I collect data from the individual level (i.e., members of the MSP working for the different partners, both companies and others) and from the aggregated level (i.e., the MSP). I then explore and make sense of such data focusing on the pharmaceutical companies, in order to reply to the research question where they are the main unit of analysis. I do not consider them as separate entities (i.e., analysing what company A had done compared to company B), but rather try to understand the common patterns that emerge from the different data sources (i.e., how do pharmaceutical MNCs participate in the knowledge sharing).

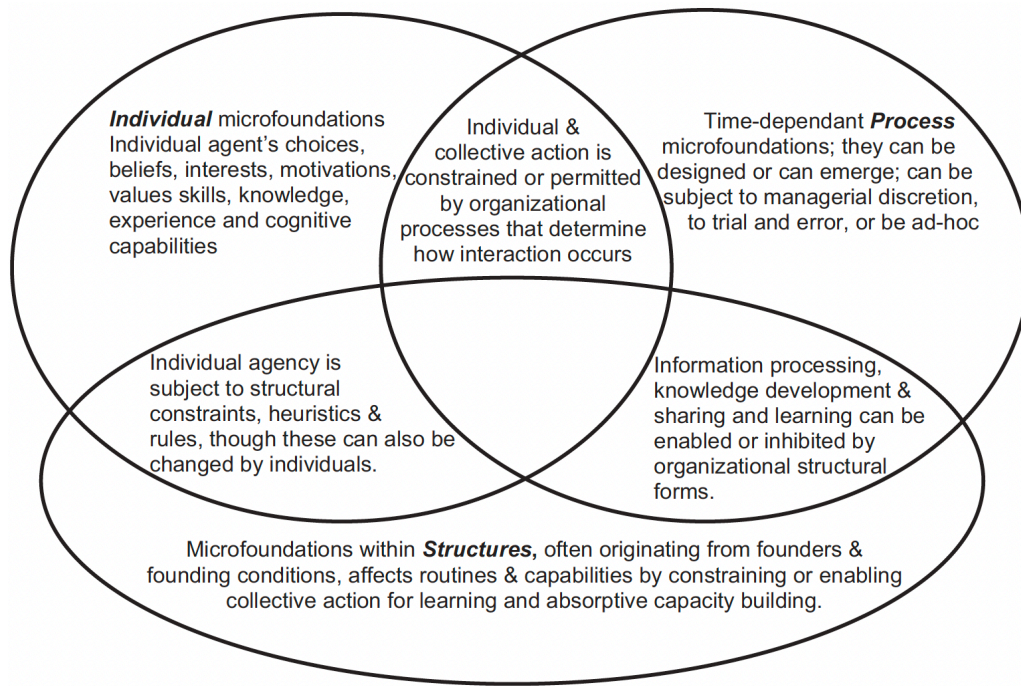


Figure 1. Microfoundations of organizational learning, (taken from: Park & Harris, 2014)

Data collection

Access to the case was granted by the leaders of the partnership, who officially introduced me to the other members during both in-person and online meetings, where I could briefly present myself and the purpose of my research. Thus, my position and my interest in the partnership were transparent and open, and I was able to emphasize the pure research purpose of my work.

In order to gain a deeper understanding of the context and familiarity with the individual members, I carried out 18 hours of observation of the work of the partnership, between October 2022 and May 2023 (Table 1 in the Appendix). I participated as a “silent guest” in two in-person and six online workshops with the members of two working groups, and in two General Assembly sessions with all partners. The in-person occasions allowed me to be introduced to several members, get to know them, and share informal conversation about their work and my research.

I also conducted semi-structured interviews with 19 individual members of the partnership, among which 11 representatives of pharmaceutical firms, six from university and research institutions, and three from a hospital, an industry association, and a public agency respectively. One person was interviewed twice [*and I plan to have a second round of interviews with key informants during fall 2023*]. Among them, seven were also covering some roles in the governance organs, i.e., they were activity managers or members of the steering group. The interviews were conducted between September 2022 and April 2023 and summed up to a total of 751 minutes, lasting on average 38 minutes (see the detailed list in Table 2, in the Appendix). The interviews followed a semi-structured interview guide (Table 3 in the Appendix) to ensure thoroughness of coverage of the key topics of interest, but also allow for flexibility in adapting to what was emerging from the interviewees.

Secondary data were collected by reviewing the following: published documents from the partnership, such as the periodic reports on their activities; newspaper articles; reports from public agencies covering relevant topics; and non-sensitive internal documents, such as internal meeting notes and presentations. This allowed to gain as much contextual understanding as

possible. Additional secondary data were collected by attending interdisciplinary conferences, workshops, and seminars about ABR. Such data provided me not only with valuable information regarding the specific knowledge being discussed the partnership, but also with further occasions to meet some of its members in a neutral but professional environment.

Data analysis

I analysed the transcripts from the interviews, the notes from the silent participation sessions, and the documents collected from secondary sources with qualitative methods, triangulating this different data in order to gain a deeper understanding of the case and support the trustworthiness of my analysis. I used multiple techniques to analyse such a rich set of text data in a structured manner (Ghauri, 2004): chronologies, to identify the key events; coding and categorizing, to summarize the key ideas from each segment of text and then group these ideas into themes; matrices and figures, to connect the different ideas and themes among themselves and with theoretical concepts.

Such an exploratory qualitative approach was deemed suitable given the lack of available constructs and formal measures to describe the phenomenon of interest, and thus the data analysis was aimed towards pattern identification, ultimately suggesting theory development (Edmondson & Mc Manus, 2007).

More specifically, the transcripts from the interviews were coded on the software Recogito®, to support the thoroughness and transparency of the analysis. I used my notes from the observation to gain a deeper understanding of the interviews, to confirm or challenge what interviewees were saying, thus guiding my interpretation while coding and categorizing the transcripts. On the other side, the official documents and reports from the partnership were used to provide a richer understanding and description of the context. Thus, the coding started in an inductive manner but was later driven theoretically, and so inductive codes were grouped deductively.

After having decomposed the data, I followed the narrative and visual mapping strategies to make sense of the qualitative data (Huberman & Miles, 1983). Narratives provide extended and thorough descriptions of some key aspects of the phenomenon and point at explanatory mechanisms embedded in the context (Doz, 2011; Welch et al., 2011). Thus, narratives describe the findings according to the main themes identified in the data, while illustrative quotes are available in the Appendix (Table 4). Finally, as visual mapping strategies allow to represent the data along different dimensions, I adopted the figure developed by Park and Harris (2014) to graphically represent microfoundations (Figure 1) to organize my findings (Figure 3).

Case description

Sweden was one of the first countries becoming involved with the fight against ABR, and promoting solutions at the political, economic and health care levels. During its European Union Presidency in 2009, Sweden introduced the topic as one of the priorities for the European agenda (Tillotson, 2010), and continued such work during its 2023 mandate (Swedish Ministry of Health and Social Affairs, 2023). Such diffused awareness and early efforts made Sweden a particularly fertile field for the advancement of several initiatives and programs to foster antibiotic innovation across multiple areas, e.g., academic research, clinical improvement, social and political activism, etc.

In this context, in 2017 a few researchers active at one university and at one hospital, together with some representatives from one pharmaceutical company, decided to establish a Swedish multisectoral partnership for antibiotic innovation in the legal form of a consortium, with funds

from the Swedish innovation agency. During the first six months, they developed the structure of the partnership, defined its priorities and set up the rules for communication and work division. In 2018 they received additional funding and were thus able to include more partners. Towards the end of 2022 a third grant was received, allowing the partnership to expand its scope, and to extend its expected lifetime until at least 2026.

As per June 2023, the partnership had 21 partners (i.e., organizations that officially signed the consortium agreement), and a number of participants or members varying between 40 and 60 (i.e., single individuals that actively participate to the partnership's activities while being employed by the partner organizations). Among the partners are two industry associations, five universities, three hospitals, four public institutions and seven companies. In turn, these companies are pharmaceutical manufacturers of antibiotics, suppliers of raw substances, and distributors of final drugs to the pharmacies and health care providers. Significantly, some of these companies are competitors on the antibiotic as well as on other markets, which makes their cooperation in the MSP interesting and challenging.

The overall goal of the partnership is to innovate the market of existing antibiotics in Sweden, and it was defined by the founders in the beginning, but its breadth has also expanded over time. The work is carried out by six different groups (Figure 2), each with a specific objective and tasks, and different compositions. All groups present some degrees of interdisciplinarity: e.g., in some there are participants from the academic, research and health care partners; others have active members from the public institutions, companies, industry associations and universities. The governance is shared among all partners, and it consists of a General Assembly and three boards (Figure 2). One of this boards, the Management Group, collects the six managers responsible for the working groups.

After the foundation, most partners were contacted and then involved via personal connections of their employees with some of the founders of the partnership. Other partners were contacted by the partnership because of their potential contribution, such as one industry association, which was already active in the field of ABR and thus held a very promising potential.

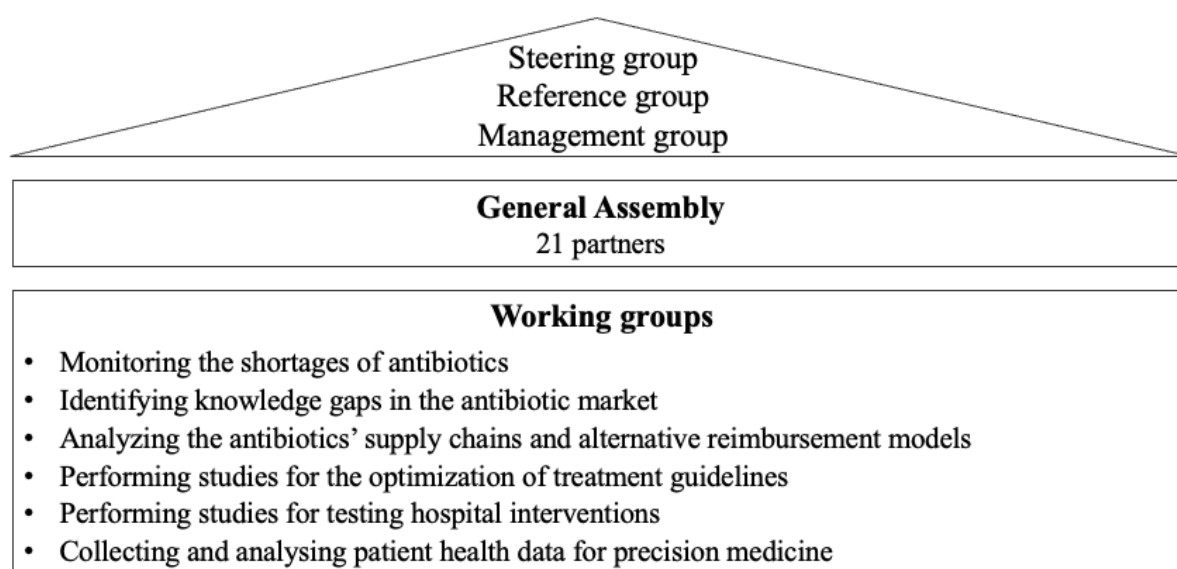


Figure 2. Structure of the partnership

Findings

Handling complexity via collaboration

Each working group is split into several sub-groups with different tasks. The main activities are discussions, workshops and open seminars, as most of the tasks require the collaboration of different professionals. The environment is informal, participants often ask for clarifications about topics or specific aspects they are not familiar with, or on the contrary provide their first-hand insights on other issues. Other activities are more practical, following different scientific methods based on the task. There are no general routines, and each group organizes and reports their work differently. Thus, many interviewees identified the structure of the partnership itself as an achievement, in that it allows for discussions and collaborations, whereas no other platforms or associations had permitted it before.

Moreover, some organizational issues have been caused by difficulties in recruitment from the partners, both in the beginning of their participation and over time, whenever any of their representatives needs to be substituted, since often the work in the partnership is not prioritized in their employers' internal staffing. This results both in delays in the work, and in discouragement for the more stable participants, who feel that their work is slowed down by the frequent staffing change. Such a problem suggests a further barrier to knowledge sharing, in that different actors assign different levels of priority to their participation. While some have troubles finding staff to represent them in the partnership, others wish to receive more task assignments or more occasions to work, such as, for example, more workshops and updates.

Handling complexity via communication

The partnership faces complex issues in both the communication among partners and how the collaborative work is handled. These issues were handled and addressed in the initial phase when the partnership was set up.

Because of the legal and ethical issues involved by the process of drug development and its public health implications, the communication between companies from the pharmaceutical industry, the prescribers (i.e., medical doctors) and the public authorities is strictly regulated. Indeed, the medical dilemmas of treating with antibiotics increases the risk connected to physicians being influenced by MNCs to overprescribe antibiotics, since abusing them bears more serious consequences than any other drugs. However, the secrecy and strict separation between industry, health care and scientific research on antibiotics has prevented potentially beneficial synergies between the knowledge owned by these different actors. As a result, no established communication channels are available in the industry, and not many attempts to cooperation have been undertaken so far.

Thus, the partnership had to set up clear rules to function in a neutral and impartial way. On the one hand, members from MNCs are allowed to join only the working groups that deal with general market topics, in order to avoid any close connection to the working groups that research specific products, whereby conflict of interests may occur. On the other hand, the partnership cannot accept any financing from the companies. Such rules are intended to encourage partners to communicate regarding all remaining topics.

In addition, wide differences in the backgrounds and sectors of the members complicate their reciprocal understanding, that takes time and efforts, especially when the discussions and work goes deeper into the specifics of the different tasks at hand. In some cases, the members feel that they cannot even provide a contribution to the discussion, because they do not have any interest in common with the other parties on some matters. In other cases, participants have

opposing views on which issues or tasks should be prioritized, and thus feel demotivated if end up working on issues that consider as less urgent.

Finally, some participants feel that more transparency would be necessary in the communication from the managers, for example with regards to the criteria of budgeting. If members do not understand or disagree with the management's decisions about their assigned budget and tasks, for example, they may not be willing to contribute to the work and thus are less likely to share their knowledge.

Given both the opportunities and challenges involved by the communication between the members, it emerges how this is one of the central elements affecting the knowledge sharing.

Trust building

Transparent communication, supported by clear rules, was reported to help building trust among the members and facilitate the knowledge sharing. The strategy pursued by the managers since the beginning was to build relationships among partners from different sectors based on long-term goals. They framed the collaborative work as truly impartial, with the potential of improving the situation for all parties involved, and thus no actor felt excluded from this goal.

Thus, trust is one of the main factors identified by interviewees as facilitating the knowledge sharing, both among members and towards the managers of the working groups. Trust is established thanks to the frequent interactions, the professionalism of the members, but also the professional relationships among some of them that pre-existed the start of the partnership.

Motivations to knowledge sharing

Once the communication rules and the work division in the partnership were set up, the process of knowledge sharing is affected first and foremost by the different motivations to share knowledge of the partners and of the individual members taking part in the work.

Considering the motivations to share knowledge within the partnership, the official goal is to create a platform where different actors could have open and transparent discussions, thus, to a certain extent, making the knowledge sharing itself the purpose of the partnership.

On the one side, MNCs' main motivation is improving the total economic value of the antibiotic market, which can only be done in collaboration with other sectors given the complexity of this market. Indeed, MNCs realize they need to discuss and share knowledge with other actors, despite the usual lack of communication. By sharing their knowledge and perspectives with actors from other sectors, MNCs take part in the discussion in a neutral arena. In addition, many MNCs are promoting sustainability initiatives, for example against antimicrobial resistance, and taking part in the partnership is conceived as one way of giving their contribution in an active way, taking a public step of responsibility towards society.

Partners from the public health, health care and academic sectors share the goal of helping society to find solutions and to spread awareness about antibiotic resistance. Some representatives report their employers to be willing to contribute with their broad-ranging expertise. In most cases, they are willing to share knowledge with the pharmaceutical companies, despite the differences in missions and need to keep their independence, because they are aware that all actors must be involved to solve the challenge.

Finally, at the individual level, I found both professional and civic motivations regardless of the background or employment of the individuals. Professional motivations are related to participants' regular work, e.g., learning technical knowledge, understanding more of the

implications of their work, networking with other professionals, participating in scientific work. As many of them have long years of experience in this field, interdisciplinary collaborations are viewed as potential solutions to many of their professional challenges. Regarding the civic motivations, participants feel a civic responsibility towards society to give their contribution to solve the challenge of ABR.

The role of leadership

Individuals involved in the partnership can either be active participants, i.e., performing various tasks within their working group, or have some managerial responsibility, such as being involved in the governance of the MSP or leading one of the working groups.

In particular, the managers organize regular meetings for their working groups, to keep an eye the pace of the work and to let every member know what others are doing. Thus, the managers play an important role as leaders, by frequently interacting with the members and proactively helping prevent potential conflicts or disagreements.

Leaders are also important in the management of the frequent in-take of new participants, which need onboarding. Newcomers' contributions are appreciated by some of the other members, who welcome new participants as the opportunity of seeing things with fresh eyes, but also seen as a challenge by others, who see the risk of discontinuation of projects and work fragmentation because of the high turnover. Thus, the leaders play a key part in making such turnover as smooth and fruitful as possible.

The mutual agreement, or consensus, reached after many of the discussions within the working groups was identified by several interviewees as the positive outcome of the leadership. They reported that no company or partner had left the partnership until then, while more actors were interested to join, thus showing that the complexity and the challenges involved by the collaboration could be overcome.

Fear, unpredictability, and divergences

As a direct consequence of the complexity of the context of the partnership and of its multisectoral nature, some barriers to the knowledge sharing were identified, such as fear, unpredictability and divergences.

Indeed, the communication barriers that exist in the antibiotic market have led many members to being dominated by fear whenever interacting with colleagues from other sectors, fear of being wrongly influenced or being accused of losing their independence. Beyond these cross-sectoral barriers, the communication is further hindered among the MNCs themselves as collaboration between competitors may infringe anti-trust regulation. Although the partnership does not directly handle any sensitive topic with regards to anti-trust matters, such as product-specific discussions, members from MNCs are still careful in their communication to avoid any potential wrongdoing. Overall, the fear that dominates the cross-sectoral communication outside the partnership has the potential of hindering the collaboration and the knowledge sharing even inside it.

Secondly, many tasks, such as the analysis of the causes of antibiotic shortages, are inherently new and hard to plan for in terms of expected duration and results, which creates a challenge for managers that need to be flexible enough to account for this unpredictability, while also monitoring the progress. As a result, budget and staff planning is often challenging and imbued with difficulties, which may become an obstacle to the actual work or to the relationships.

Related to this, participants seem to have different opinions on the role of the partnership in the international field, i.e., whether it should be considered as a role model for others, or just

focus on the national arena. Some participants feel the urgency of expanding the partnership to other countries and contribute to international or European projects, while others are unsure about the ability of the partnership to provide real contributions to other countries, given the high complexity and national specificity of several dynamics. Such a divergent view affects individual motivations to engage in the discussions related to this topic.

Finally, a further hindrance comes from the potential confusion in how participants conceive the nature of the partnership: is it a platform for discussions and collaboration, or a research-based organization? Such a diverging nature may create tensions in the structure and in the work.

Shared knowledge and other achievements

The first achievement of the partnership is the intangible knowledge being shared among the participants, as well as the new knowledge created as the result of the projects carried out by the working groups. All interviewees reported an increased understanding of the market, awareness of its complexity and of others' perspectives. The shared knowledge is about the antibiotics market itself, e.g., functioning of the supply chain, need and usage in medical treatments, reimbursement mechanisms, as well as understanding of which changes or interventions would be feasible. For example, experts of the distribution channels share their knowledge of the causes of drugs availability (or unavailability) in pharmacies and hospitals, which was not possessed by other members, such as physicians or some representatives of the pharmaceutical companies – both knowledgeable of the two opposite ends of the chain, but often not of the mid rings. Other participants are more updated about ongoing political discussions or the latest clinical guideline for a certain disease. Given the interdisciplinarity of the working groups, participants share knowledge about the methodologies and technical approaches used in different scientific fields, from how to conduct a health economic assessment, to how to carry out a clinical study.

Tangible results were indicated in some of the delivered projects of the partnership, such as the results from some laboratory and hospital studies, and some reports that were used by public authorities and presented to the government, e.g., about the list of essential antibiotics, the causes of antibiotic shortages and the actions to solve them. Thus, another achievement is that the partnership has started to be recognized as an influential and reliable party for public authorities and any other actor interested in contributing to the challenge of antibiotic resistance.

Building on its achievements, the partnership is also gaining reputation as an impartial and science-grounded organization, which supports the trust, both externally and internally, and thus facilitates the knowledge sharing. Such achievements, despite being rooted in the local context of the country of the MSP, are often reported by the business representatives to their companies' headquarters, showing how strategic this participation can become both nationally and internationally.

Discussion

This single case study explores the factors affecting the structure of a multisectoral partnership for antibiotic innovation, the process of knowledge sharing and the role of individuals that collaborate in it. Based on a thematic analysis and on the triangulation of primary and secondary data, I discuss the main findings within the microfoundations framework proposed by Park et al. (Park & Harris, 2014). Thanks to this approach, it is possible to represent with three overlapping circles the elements of individual, process and structure microfoundations as

well as their interactions (Figure 1). Therefore, I assigned the themes found in the data to the three elements (circles) and their intersections to graphically present my findings (Figure 3).

Firstly, the structure of the partnership is explained in terms of its goal, governance structure and rules leading to transparency, and how such structure embeds the motivations of the partners. These elements represent the conditions or the environment where the knowledge sharing takes place (Felin et al., 2012). The structure presents several elements of complexity when it comes to the process of knowledge sharing (intersection). Indeed, the findings indicate how the high level of complexity of the grand challenge of ABR is mirrored into high complexity within the partnership.

Then, the work division and the set-up of the collaboration, concretely affecting how tasks and activities are carried out within the partnership, illustrate how the process of knowledge sharing unfold. Such process, consisting of group discussions, workshops, individual assignments and responsibilities, is carried out by members within the given structure of the partnership. In participating to the process, individuals face some relevant barriers, such as fear, unpredictability and divergences, as well as are deeply involved in learning (intersection).

Finally, the elements of leadership and individual motivations to knowledge sharing are the main features of individual microfoundations for the knowledge sharing process. The structural elements of the partnerships discussed above allow to communication and trust building among individuals to happen.

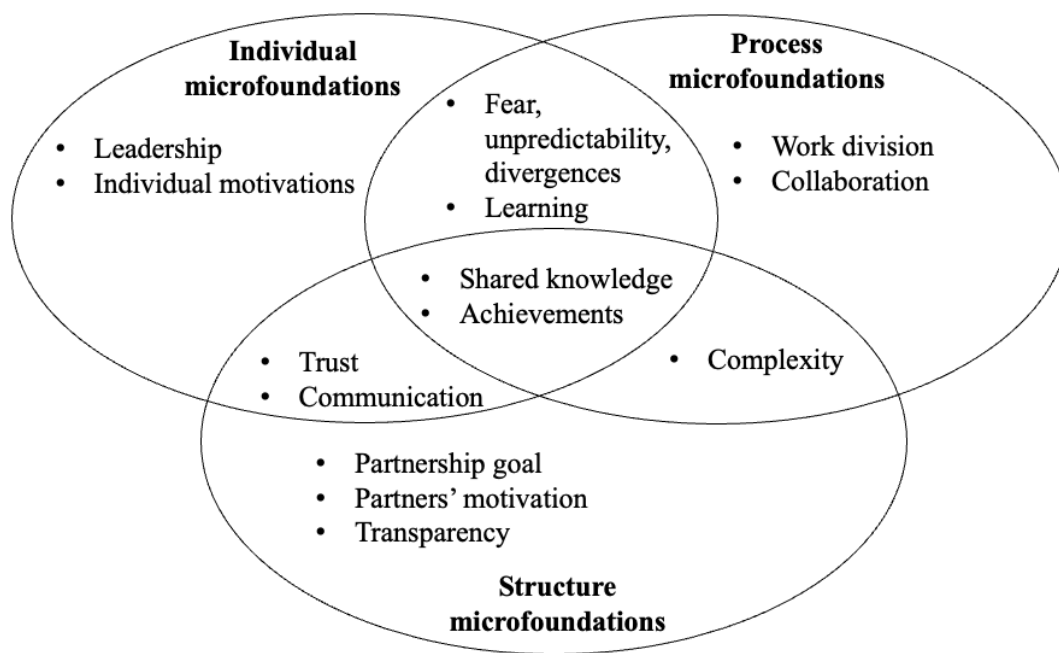


Figure 3. Microfoundations of knowledge sharing in the case of a multisectoral partnership for antibiotic innovation (based on the figure drawn by Park & Harris, 2014)

Limitations

The study is limited in that the results risk to be idiosyncratic, as they are taken from a specific country, whose history, culture and legal system have played an important role in the development of the case. However, the deep contextualization, obtained thanks to a careful triangulation of multiple sources and the reporting of several quotes, supports the trustworthiness of the data and the case understanding. These, in turn, provide a solid basis for

transferability to similar settings (Miles & Huberman, 1994) and theoretical generalizations (Welch et al., 2011).

Conclusion

This contextualized single-case study analyses the microfoundations of knowledge sharing in a multisectoral partnership for antibiotic innovation. A microfoundations approach allows to identify which elements of the structure and process within the partnership affect individual actions and motivations to share knowledge. The analysis allows to better understand how knowledge sharing among partners from different sectors can work in a collaborative setting, ultimately shading more light on how MNCs can contribute to grand challenges via multisectoral partnerships.

Future research on this topic could further explore this topic, as several questions deserve more attention. For example, how does the durability of the achievements of the partnership affect the motivations to knowledge sharing? It could also explore potential misalignments in motivations at the level of the partners, among and within the different MNCs, and what impact they generate in terms of learning for the participating MNCs. In particular, more evidence is necessary to better understand the connections between motivations to knowledge sharing and the transfer of the achievements from the partnership into the partners. For example, how is the absorptive capacity of MNCs affecting their motivations to participate in multisectoral partnerships?

References

- Aguinis, H., Bergh, D., & Molina-Azorin, J. F. 2023. Methodological challenges and insights for future international business research. *Journal of International Business Studies*, 54(2): 219–232.
- Argote, L., McEvily, B., & Reagans, R. 2003. Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science*, 49(4): 571–582.
- Baraldi, E., & Strömsten, T. 2009. Controlling and combining resources in networks - from Uppsala to Stanford, and back again: The case of a biotech innovation. *Industrial Marketing Management*, 38(5): 541–552.
- Buckley, P., & Casson, M. 1988. A Theory of Cooperation in International Business. *Cooperative Strategies in International Business*. Lexington Books.
- Buckley, P., Doh, J., & Benischke, M. 2017. Towards a renaissance in international business research? Big questions, grand challenges, and the future of IB scholarship. *Journal of International Business Studies*, 48(9): 1045–1064.
- Ciabuschi, Baraldi, & Lindahl. 2020. Joining forces to prevent the antibiotic resistance doomsday scenario: The rise of international multisectoral partnerships as a new governance model. *Academy of Management Perspectives*, 34(4): 458–479.
- Ciabuschi, F., & Lindahl, O. 2018. The Decline of Innovation in the Antibiotics Industry and the Global Threat of Antibiotic Resistance: When Entrepreneurial Efforts are Not Enough. *Entrepreneurship and the Industry Life Cycle*, 205–229.
- Coviello, N., Kano, L., & Liesch, P. W. 2017. Adapting the Uppsala model to a modern world: Macro-context and microfoundations. *Journal of International Business Studies*, 48(9): 1151–1164.
- Dentoni, D., Bitzer, V., & Pascucci, S. 2016. Cross-Sector Partnerships and the Co-creation of Dynamic Capabilities for Stakeholder Orientation. *Journal of Business Ethics*, 135(1): 35–53.
- Doh, J. P. 2015. From the Editor: Why we need phenomenon-based research in international business. *Journal of World Business*, 50(4): 609–611.
- Doz, Y. 2011. Qualitative research for international business. *Journal of International Business Studies*, 42(5): 582–590.
- ECDC. 2022. *Antimicrobial Resistance in the EU/EEA - A One Health Response*.
- Edmondson, A. C., & Mc Manus, S. E. 2007. Methodological fit in management field research. *Academy of Management Review*, 32(4): 1155–1179.
- Felin, T., Foss, N. J., Heimeriks, K. H., & Madsen, T. L. 2012. Microfoundations of Routines and Capabilities: Individuals, Processes, and Structure. *Journal of Management Studies*, 49(8): 1351–1374.
- Fernhaber, S. A., & Zou, H. 2022. Advancing societal grand challenge research at the interface of entrepreneurship and international business: A review and research agenda. *Journal of Business Venturing*, 37(5). <https://doi.org/10.1016/j.jbusvent.2022.106233>.
- Fortwengel, J., Gutierrez Huerter, G., & Kostova, T. 2023. Three decades of research on practice transfer in multinational firms: Past contributions and future opportunities. *Journal of World Business*, 58(3). <https://doi.org/10.1016/j.jwb.2023.101430>.

- Foss, N. J., & Pedersen, T. 2019. Microfoundations in international management research: The case of knowledge sharing in multinational corporations. *Journal of International Business Studies*, 50(9): 1594–1621.
- George, G., Howard-Grenville, J., Joshi, A., & Tihanyi, L. 2016. Understanding and tackling societal grand challenges through management research. *Academy of Management Journal*, 59(6): 1880–1895.
- Ghauri, P. 2004. Designing and conducting case studies in International Business research. In R. Marschan-Piekkari & C. Welch (Eds.), *Handbook of qualitative research methods for International Business*: 109–124. Cheltenham: Edward Elgar Publishing.
- Gray, B., & Purdy, J. 2018. *Collaborating for our future: Multistakeholder partnerships for solving complex problems*. Oxford University Press. <https://doi.org/10.1093/oso/9780198782841.001.0001>.
- Haas, M. R., & Cummings, J. N. 2015. Barriers to knowledge seeking within MNC teams: Which differences matter most. *Journal of International Business Studies*, 46(1): 36–62.
- Hansen, M. T. 1999. The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits. *Administrative Science Quarterly*, 44: 82–111.
- Hardin, G. 1968. The Tragedy of the Commons. *New Series*, vol. 13.
- Huberman, A. M., & Miles, M. B. 1983. Drawing Valid Meaning from Qualitative Data: Some Techniques of Data Reduction and Display. *Quality and Quantity*, 17: 281–339.
- Kalling, T., & Styhre, A. 2003. *Knowledge sharing in organizations*. Malmö: Liber.
- Kogut, B., & Zander, U. 1993. Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of International Business Studies*, 4: 625–645.
- le Ber, M. J., & Branzei, O. 2010. Towards a critical theory of value creation in cross-sector partnerships. *Organization*, 17(5): 599–629.
- MacDonald, A., Clarke, A., & Huang, L. 2019. Multi-stakeholder Partnerships for Sustainability: Designing Decision-Making Processes for Partnership Capacity. *Journal of Business Ethics*, 160(2): 409–426.
- Mäkelä, K., Andersson, U., & Seppälä, T. 2012. Interpersonal similarity and knowledge sharing within multinational organizations. *International Business Review*, 21(3): 439–451.
- Miles, M. B., & Huberman, A. M. 1994. *Qualitative data analysis*. New York: SAGE.
- Minbaeva, D. B. 2007. Knowledge Transfer in Multinational Corporations. *Management International Review*, 47(4): 567–593.
- Murphy, M., Perrot, F., & Rivera-Santos, M. 2012. New perspectives on learning and innovation in cross-sector collaborations. *Journal of Business Research*, 65(12): 1700–1709.
- Narula, R., & Dunning, J. H. 1998. Explaining international R&D alliances and the role of governments. *International Business Review*, vol. 7.
- OECD. 2018. *Stemming the Superbug Tide: Just A Few Dollars More*. Paris. <https://doi.org/10.1787/9789264307599-en>.
- Oh, C. H., & Oetzel, J. 2022. Multinational enterprises and natural disasters: Challenges and opportunities for IB research. *Journal of International Business Studies*, 53(2): 231–254.

- Park, J. Y., & Harris, S. 2014. Microfoundations for learning within international joint ventures. *International Business Review*, 23(3): 490–503.
- Reuber, A. R., Alkhaled, S., Barnard, H., Couper, C., & Sasaki, I. 2022. Something borrowed, something new: Challenges in using qualitative methods to study under-researched international business phenomena. *Journal of International Business Studies*. <https://doi.org/10.1057/s41267-022-00555-1>.
- Ritvala, T., Salmi, A., & Andersson, P. 2014. MNCs and local cross-sector partnerships: The case of a smarter Baltic Sea. *International Business Review*, 23(5): 942–951.
- Selsky, J. W., & Parker, B. 2005, December. Cross-sector partnerships to address social issues: Challenges to theory and practice. *Journal of Management*.
- Siggelkow, N. 2007. Persuasion with case studies. *Academy of Management Journal*, 50(1). <https://doi.org/http://dx.doi.org/10.5465/AMJ.2007.24160882>.
- Silver, L. L. 2011. Challenges of Antibacterial Discovery. *Clinical Microbiology Reviews*, 24(1): 71.
- Sriram, A., Kalanxhi, E., Kapoor, G., & et al. 2021. *State of the world's antibiotics 2021: A global analysis of antimicrobial resistance and its drivers*. Washington DC.
- Swedish Ministry of Health and Social Affairs. 2023. *High-level meeting on antimicrobial resistance (AMR)*. <https://swedish-presidency.consilium.europa.eu/en/events/high-level-meeting-on-antimicrobial-resistance-amr-6-73/>.
- Szulanski, G. 1996. Exploring Internal Stickiness: Impediments to the Transfer of Best Practice Within the Firm. *Strategic Management Journal*, 17: 27–43.
- Tang, K. L., Caffrey, N. P., Nóbrega, D. B., Cork, S. C., Ronksley, P. E., et al. 2017. Restricting the use of antibiotics in food-producing animals and its associations with antibiotic resistance in food-producing animals and human beings: a systematic review and meta-analysis. *The Lancet. Planetary Health*, 1(8): e316–e327.
- Tillotson, G. 2010. Stimulating antibiotic development. *The Lancet Infectious Diseases*, 10(1): 2–3.
- van Zanten, J. A., & van Tulder, R. 2018. Multinational enterprises and the Sustainable Development Goals: An institutional approach to corporate engagement. *Journal of International Business Policy*, 1(3–4): 208–233.
- Welch, C., Piekkari, R., Plakoyiannaki, E., & Paavilainen-Mäntymäki, E. 2011. Theorising from case studies: Towards a pluralist future for international business research. *Journal of International Business Studies*, 42(5): 740–762.
- Wellcome Trust. 2021. *The antibiotic drug discovery landscape: barriers to engaging and needs for support of researchers*. Uppsala.
- Westley, & Vredenburg. 1991. Strategic bridging - The collaboration between environmentalists and business in the marketing of green products. *Journal of Applied Behavioural Science*, 27(1).
- WHO. 2020, July 31. *Antibiotic resistance*. <https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance>.
- Wright, G. D. 2016. Solving the Antibiotic Crisis. *ACS Infectious Diseases*, 1(2): 80–84.

- Yildiz, H. E., Murtic, A., Zander, U., & Richtnér, A. 2019. What Fosters Individual-Level Absorptive Capacity in MNCs? An Extended Motivation–Ability–Opportunity Framework. *Management International Review*, 59(1): 93–129.
- Zorzet, A. 2014. Overcoming scientific and structural bottlenecks in antibacterial discovery and development. *Uppsala Journal of Medical Sciences*, 119(2): 170.

Appendix

Table 1. Details of the observation sessions

ID	Date	Activity	Length (hours)	Session type	Nr participants
O1	2022-10	Joint workshop of 2 working groups	3	In person	21
O2	2022-10	General assembly	2	In person	30
O3	2022-12	Joint workshop of 2 working groups	1	Zoom	14
O4	2022-12	Information session for all partners	2	Zoom	22
O5	2023-01	Joint workshop of 2 working groups	1	Zoom	13
O6	2023-02	Joint workshop of 2 working groups	1	Zoom	14
O7	2023-03	Joint workshop of 2 working groups	1	Zoom	19
O8	2023-04	Joint workshop of 2 working groups	1	Zoom	18
O9	2023-05	Updating session of 2 working groups	3	Hybrid	22
O10	2023-05	General assembly	3	In person	44

Table 2. Details of the interviews conducted

ID	Date	Role	Length (minutes)	Employer type
I1	2022-09-09	Manager	52	University & Research
I2	2022-09-22	Manager	42	University & Research
I3	2022-10-12	Manager	44	University & Research
I4	2022-11-11	Participant	49	University & Research
I5	2022-11-16	Participant	27	Company
I6	2022-11-21	Steering group	42	Other
I7	2022-11-28	Participant	47	Company
I8	2022-11-28	Participant	27	Company
I9	2022-12-01	Former participant	35	Company
I10	2022-12-02	Former participant	17	Company
I11	2022-12-06	Manager	32	Other
I12	2022-12-08	Former Manager	38	Other
I13	2022-12-08	Participant	24	Company
I14	2022-12-09	Participant	38	Company
I1	2023-03-13	Manager	28	University & Research
I15	2023-03-15	Participant	28	Company
I16	2023-03-28	Former Manager	44	University & Research
I17	2023-03-31	Manager	56	Company
I18	2023-04-17	Participant	40	Company
I19	2023-04-28	Participant	41	Company

* The employer type “other” includes: industry associations, public agencies, health care providers

Table 3. Semi-structured interview guide

Topic	Examples of questions
Activities	What have you been doing in the partnership? When did you start working in the partnership? What are the main tasks or activities you are/have been involved with?
Motivations	Why did you join? What is the main interest/objective for your organization in joining the partnership?
Relationships	Have you been working in closer contact with any particular partner? Do you think different sectors can collaborate well, or different objectives can be combined in the partnership?
Positive aspects	What do you think is working well in the partnership? What are the achievements of (your work in) the partnership so far? What have you been learning?
Challenges	Did you encounter any special problem/conflict? What can be improved in the way that the partnership works?
Similar experiences	Have you been involved in other projects/similar partnerships before? Do you know of similar projects in other countries? Do you think this type of collaboration/platform would be useful also on other products/market? Why so?
Organizational learning	Do you report back to your organization about your activities in the partnership? Is your company involved in other similar initiatives in other countries to your knowledge?

Table 4. Illustrative quotes of the themes identified in the data

Theme	Illustrative quotes	Interviewee
Complexity of the antibiotic market	Market data about drugs distributions in primary and hospital care are not relevant in the antibiotic market. Even if sales of a given drug were very low, it might still be considered as an essential drug that doctors need available to treat specific patients... The market is too opaque.	I1
	It is an ethical dilemma, which is not only taking into account the patient in front of you, but you need to think about the whole perspective. And therefore, it's more complicated.	I12
	In the antibiotic field, the medicines keep getting worse or less effective because of the resistance. So, if doctors work together with the company, and they are influenced to use their products more frequently, we will lose their efficacy in the end. So, we also try to use as little as possible, whereas in other fields the only constraint you would have is the benefit of the patient, i.e, that the side effects outweigh the benefit for the patient, but it is always in the best interest of the patient.	I12
	That's the problem, we are so many actors that work in silos.	I6
	For people who do research, this means that they will not get all information that they need sometimes. And for industry, they don't get feedback or input from the reality. So, I think also knowledge about infections within the medical industry has decreased, because we don't interact anymore. Companies don't get feedback on how their products should be used and how we're using them. ... So, I think we lose something if we don't talk to each other at all.	I12
	There will never be another way without collaboration, because there will always be different organisations that are responsible for different things and have different roles in the market.	I6
The structure of the partnership	We were a couple of researchers that met on a conference, organized by the university, where academia and industry met over different themes. And so, we were in a discussion with some pharmaceutical companies, and we realised the need, or the problem, of old antibiotics disappearing from the market for different reasons and the difficulties in collaborating between academia and industry on these issues. The idea of the partnership was born.	I12
	It is important to remember that the partnership's mission is not to take away the thresholds, because in many aspects they're good. It is just to create an arena and a regulated and well-functioning environment, where we can communicate without destroying the threshold, without breaking the thresholds, we can still come closer and talk about important things.	I12
How knowledge is shared: activities	It's good that you have working packages that are more specific, working with fewer issues.	I6
	It's a multi-functional group or a multi-disciplinary group, with pharma and authorities, as well as academia.	I7
	I think it works quite well. There are chairs and co-chairs within each work package, especially when it comes to different assignments that we have. And they sort of lead the path forward, the way forward for each project. So, in general, I think it's a good collaboration. It's equal, meaning that that everyone can have their voice heard.	I7
	We participated in all these big workshops.	I9
What knowledge is shared?	I think it's good to have this broader perspective.	I4
	I think it's very rewarding and very interesting to get different views and different opinions from different groups.	I7
	I think it's good for participants to know what's going on.	I12
	I think that the partnership for me was a very good exercise and a very good insight into projects and organisations outside my core field	I12

Achievements of the partnership	This is actually fascinating because every time I learn so many new things... With this kind of collaboration, we see each other with new eyes. And that is good... I think that the picture is quite clear now.	I6
	It was really appreciated to have a communication with the partnership, [as if they were] the forerunners. Because you get a bit of a wider view... I think you could get a wider response, or a more comprehensive response.	I9
	The partnership has also been so successful. We have really changed a lot of things and worked through different challenges, and more and more companies and organisations have joined it. And we have also seen the issues, and lots of things that we thought in the beginning 'how could this be possible?' turned out to be possible.	I6
	We managed to get the partnership working, I guess it's an established organisation or network, in some sense, today and it has had some impact in different aspects. And at least to some extent worked as the meeting platform or the connection that we wanted in the beginning.	I12
Motivations to knowledge sharing	Some define our work a 'think tank', but for me it is a limiting definition. In facts we are a discussion forum, but we also advance concrete proposals and solutions.	I1
	It is about filling in knowledge gaps in antibiotics, generating new knowledge.	I2
	It's also part of their image. It is something good to be involved in this kind of projects.	I4
	They always have business and the economic perspectives, but I also think that they want a sustainable society.	I6
	I think that just being a part of this platform and these partners, I think that is of value for us... We also want to be part of raising the awareness and urgency of this antibiotic question.	I4
	Because it's such an important thing and everyone can contribute... we all want a better world, somehow, for our fellow citizens.	I6
	It is very essential work on what we're trying to do here.	I7
	I found that the people involved in the partnership personally and genuinely interested in this question.	I12
Facilitators to knowledge sharing	There is trust among the people in the partnership, in that we work and discuss together.	I1
	[In the beginning] we were four people that got to know each other, and you sort of got to know the person, regardless of whether they were pharma-employed or not, and his or her sort of ideas and motivations. Then, you build up trust in that relation that this is not [for profit]... I think it was very dependent, at least for me, on getting to know the people more closely.	I12
	It's important to have a transparent discussion, and everyone knows the rules.	I12
	I think the organizers are very good for having regular meetings, interesting topics. I mean, everyone can say [something], it's quite accessible... I mean everyone can be heard, and it's no problem to ask questions. So, it's a good climate.	I4
	One of the managers is really good with people, and get them to feel that they contribute and can be relaxed. I think that has been one of the success factors.	I6
Barriers to knowledge sharing	From a broad perspective everyone agrees... but again, as it is the case in almost every situation when you dig into this and need to go on a granular level, and need to work with each specific detail, it is a bit more complicated.	I7
	It could be [difficult] of course in some issues, that not all can contribute to.	I4
	It has at least two different faces in my opinion: the more structural-organisational part, and then the more research-project part, with studies of how to use existing antibiotics more efficiently or better in one way or another... It creates a little bit of tension: is the partnership an organisation that, in one way or another, funds research, or is it a structural collaboration, ... a new structure?	I12