1 Introduction: Interorganizational Dynamics and Innovation

Public service innovation, namely, the adoption of new ideas, technology, and methods of public service delivery (Vries, Bekkers, and Tummers, 2018; Walker, 2008), is of growing importance for governments and frontline public service organizations. Diverse societies and the rapidly changing "policyscape" produce challenges to policy maintenance and effective implementation (Mettler, 2016). Evolving societal, political, and technological factors and changing demands on various public services drive service organizations to make innovative adaptations to their external market and political environment (Leyden and Link, 2015).

Conventionally, scholars have studied public and private sector innovation as distinctive phenomena, arguing that private sector innovation primarily aims to increase firms' survivability and their profit margins, while public sector innovation is to achieve improvements in governance and performance (Moore, 1995). Since the 1990s, many public sector organizations have adopted pro-competition reforms and technology innovation to improve the efficiency and effectiveness of public service delivery, making innovation a central theme in public management and public policy research (Osborne and Brown, 2005). Following the diffusion of New Public Management (NPM), there has been an outpouring of empirical studies that focus on different types of innovation at both the individual and the organizational level, such as process reform, technology innovation, product or service innovation, and knowledge creation (Vries, Bekkers, and Tummers, 2018; Yao and Walker, 2019).

In spite of the different goals and types of innovation seen in the public and private sectors, theories and empirical studies regarding why organizations change and innovate abound. Four approaches of studying organizational innovation emerge from the existing literature: (1) theories of rational firms and innovation focus on market competition and organizational capacity as the main drivers of innovation; (2) the literature on innovation management gives particular attention to leadership priority and leadership style; (3) resource dependency theory considers an organization's political, social, and economic environment as drivers of innovation; and (4) theories of interorganizational networks deem collaborative relationships as the main venue for learning and the diffusion of innovation.

Scholars of rational firms conceptualize organizational behavior such as innovation and organizational change as the result of "learning from the market" (Bouwen and Fry, 1991; Levitt and March, 1988; Salge, 2011; Teece, 1992). Decisions of adopting innovation, in this literature, are thought to be routine-based and goal-oriented bounded rational behavior. Under this premise,

scholars in this camp have advanced knowledge regarding how the need for innovation and change stem from organizations' rational assessment of goal achievement (performance) (e.g., Nicholson et al., 2017; Salge, 2011; Zhu and Rutherford, 2019), resource slacks, and organizational competence. For example, organizational size, entrepreneurship, and available high-skill human capital (Kimberly and Evanisko, 1981) are recognized as major internal drivers of innovation. Following the same premise of the bounded-rationality model, numerous studies also examined how external market competition drives innovation outputs and firm investment in research and development (R&D) (Aghion et al., 2005; Negassi and Hung, 2014). The emphasis on the internal antecedents of innovation has also been the subject of empirical examination regarding public sector innovation. Walker (2014) surveys the literature on local government innovation and concludes that organizational size, administrative capacity, and organizational learning are key drivers of local government innovation. These internal antecedents are rarely studied in relation to external determinants in the literature. Analyzing the English National Health Service (NHS) System, Salge (2011) concludes innovation decisions in British hospitals follow the rational behavioral model, which is defined by the slack search process (excessive resources) and problem search process (negative performance feedback).

In a different camp, scholars of innovation management conceptualize innovation as an organizational output shaped by entrepreneurship (Windrum and Koch, 2008), leadership quality (Lewis et al., 2018), leadership style (Hughs et al., 2018; Jung, Wu, and Chow, 2008; Martin, Currie, and Finn, 2009), and top-level managerial priorities (Damanpour and Schneider, 2006). The leadership approach of innovation research focuses on top leaders as the human agents of change. Empirical evidence on how leaders matter for organizational innovation converges between studies on private sector firms and public sector organizations. For example, Jung, Wu, and Chow (2008) find a positive relationship between CEO transformational leadership and firms' innovativeness. Similar evidence is reported in the Lewis et al. (2018) study in public sector innovation.

The third theoretical approach of organizational innovation focuses on the external contingencies of organizations. The external contingency approach of innovation centers on the idea that organizations are dependent on their external political, social, and economic environment for resources, stakeholder support, and reputation. This approach is a core extension of the open system theory. (Katz and Kahn, 1978; Pfeffer and Salancik, 1978). In their seminal book, The *External Control of Organizations*, Pfeffer and Salancik (1978) highlight the notion that, for organizational choices and decisions to be understood, it is

necessary to focus on the external social context rather than internal factors and leaders' values and beliefs. In a nutshell, the external contingency perspective recognizes that organizations engage in innovation activities in accordance with their assessment of various external resource constraints and different client inputs (Aldrich and Ruff, 2006; DiMaggio and Powell, 1983; Pfeffer and Salancik, 1978).

The idea that embedded social relationships can spark change has later been further developed by organizational scholars who are interested in interfirm social networks (e.g., Uzzi, 1997), and policy scholars who are puzzled about the adoption and diffusion of policy innovations in the government sector. In this literature, scholars focus primarily on how policy networks, socially embedded relationships, and collaborative interactions produce policy innovation (Balla, 2001; Bennett and Howlett, 1992; Howlett and Koppenjan, 2017; Nicholson-Crotty, 2009). Similar to the external contingency perspective, scholars of interorganizational collaboration emphasize the role of the external social environment in driving organizational behavior. The network of interdependencies and social relationships form channels of learning, knowledge diffusion, and isomorphic pressures for change and innovation (DiMaggio and Powell, 1983; Powell, 1990; Powell and DiMaggio, 1991). Social embeddedness and organizational networks, according to Uzzi (1997), also enable organizations to make complex adaptations and reach collective problem-solving arrangements, thus facilitating innovation.

The existing literature provides diverse theoretical approaches to examining the key drivers of innovation, with increasing attention to the horizontal interorganizational relationships and innovation (Provan, Fish, and Sydow, 2007). However, most previous studies overlook the complex way in which organizations interact with each other and examine interorganizational competition and collaboration as two opposite ends on a single continuum, as distinctive drivers of change and innovation. In fact, the line between public and private service sector service production is blurred, as many public services are increasingly delivered through interorganizational networks that connect organizations from both the public and private sectors, which may produce complex interorganizational dynamics. On the one hand, service organizations may collaborate with one another because of shared goals and complementary resources and expertise. On the other hand, service organizations may coexist in the same local market and compete with one another for clients, funding, and human capital. How do such complex interorganizational dynamics, namely, collaboration and competition, affect innovation?

To advance knowledge on how complex interorganizational dynamics affect innovation, I integrate literatures on interorganizational collaboration,

market competition, and theories of coopetition. The theoretical framework of this research draws from the external contingency perspective, by focusing on how external interorganizational relationships affect innovation activities. It centers on the concept of coopetition (Brandenburger and Nalebuff, 1996), which conceptualizes competition and collaboration as two connected interorganizational dynamics that drive various innovation activities (Bunger et al., 2020; Devece et al., 2019; Hartley et al., 2013; Lado et al., 1997). Focusing on the simultaneous presence of competition and collaboration across organizations, the theoretical framework connects with the external contingency perspective of innovation by focusing on interorganizational interactions rather than internal organizational factors.

Specifically, I argue that market competition and interorganizational collaboration are two different yet interconnected forces that drive innovation under different mechanisms (Lado et al., 1997; Tsai, 2002). Competition exists among organizations that produce mutually substitutable services, serve the similar client populations, and are dependent on the same labor-force pool (Bunger et al. 2020). Collaboration is driven by shared interests, common external challenges, and stakeholder preferences. Following Lado et al. (1997), I conceptualize four different scenarios of horizontal interorganizational relationships: *isolated monopoly*, *neck-to-neck competition between silo organizations*, *highly networked world*, and *coopetition.* An isolated monopoly emerges when an organization does not have any competitor and does not collaborate with others. Neck-to-neck competition between silo organizations occurs when organizations engage with one another only by competitive relationships and form no collaborative ties. In the highly networked world, collaboration is high and competition among partners is low. Coopetition arises when dense collaborative relationships exist in highly competitive markets.

Using this typology, I explore how the interplay between competition and collaboration drives the adoption of various innovations. Competitive pressures from local service markets drive innovation, particularly the adoption of low-cost service innovation, because intense competition motivates organizations to put an emphasis on innovation activities that will help them to expand revenue sources and clients (Aghion, Howitt, and Prantl, 2013). Innovation, nevertheless, can be costly to organizations, such as the adoption of new technology that requires a large amount of initial investment. Intensive competition thus might turn organizations into a less innovative mode and increase the favorability of the status quo. In such situations, collaborative networks can help organizations retain costs associated with innovation in various ways. First, collaborative networks facilitate innovation by reducing both the cost

and uncertainty of innovation. Second, collaborative networks are channels for diffusing new knowledge and information. Thus, in competitive markets, high-cost technology innovation can increase through collaborative channels (Ritala and Sainio, 2013).

The American health care sector, whereby innovation is key to improve service quality, offers an ideal empirical context to examine the links between the interorganizational dynamics of coopetition. In the USA, health care provider organizations (hospitals) in all three sectors are responsible for delivering health care to patients. Hospitals from different sectors produce and deliver health care services based on comparable medical industry standards. Hospitals from the same area often engage in interorganizational collaborations for more effective service delivery. Meanwhile, hospitals in the same local area compete with one another for government funding, patients (especially Medicare patients), health care professionals, and are often engaging in competitive bidding for health insurance contracts (Keijser and Kirkman-Liff, 1992). The complex interorganizational dynamics make it possible to examine how collaborative and competition jointly affect innovation in the health care sector.

The empirical analysis is based on a panel study of 4,000+ American hospitals from 2008 to 2017, an empirical sample covering about 75 percent of the American hospitals from the public, nonprofit, and private sectors. The longitudinal panel dataset covers years before and after the enactment of the Affordable Care Act (ACA) 2010 that introduced substantial changes to hospitals' local health care markets and accountability requirements on cost containment and performance management. Salient changes in national- and subnational-level health policies under the ACA create opportunities and incentives for hospital innovation and variations in the pace of innovation across the three sectors and hospital locations. Using dynamic panel data models, I analyze innovation in several thousands of hospitals based on multiple innovation indicators: hospitals' adoption of new medical technology, such as robotic surgery and electronic health records, the adoption of mobile health care and telemedicine, and pioneering hospitals that adopted patient-centered care models, such as the Patient-Centered Medical Home Program (PCMH) and the Accountable Care Organization (ACO). I find robust evidence that coopetition significantly affects the adoption of innovation, albeit that the links between coopetition and innovation vary by innovation areas. For technology innovation with spiraling costs, coopetition accelerates the adoption. Hospitals that simultaneously have a high level of market competition and collaborative service delivery are most likely to pursue expensive new medical technology. For patient-oriented service innovation, strong inter-hospital collaboration and

low-competitive pressures are associated with a greater likelihood of adoption. Regardless of the specific innovation type, nevertheless, isolated monopolies are found to be the laggards of innovation in most cases.

This research makes several contributions. First, this research generalizes the link between interorganizational collaboration and innovation across all three sectors, thus it differs from prior studies that focus on service innovation just in one sector. This research also speaks to the rich literature that links organizational innovation to the external environment (Akkerman and Torenvlied, 2011, Boyne and Meier, 2009; Meier and O'Toole, 2015), by highlighting that both interorganizational collaboration and competition offer new ways of thinking about service organizations' social-environmental contexts. Third, this research adds to the literature on the sociology of institutions (Powell, 1990) by showing the interactive effects of interorganizational collaboration and market competition. Demonstrating that organizations are embedded within market structures and collaborative relationships, the coopetition framework broadens the understanding of service innovation in more complex interorganizational contexts. As the existing literature on coopetition and innovation largely remains to be small-N qualitative and primarily focuses on business firms (McCarthy et al., 2018) moreover, there is only suggestive evidence that coopetition between organizations better motivates innovation than competitive pressures simply coming from the market (LeTourneau, 2004; Yami and Nemeh, 2014). This research fills in the gap by providing a large-N systematic analysis of how interorganizational collaboration in competitive environments shapes innovation. Different from studies that focus on a small number of networks and take the whole-network approach (Bunger et al., 2020), the empirical analysis traces a nationally representative sample of hospitals in a ten-year period. Key empirical findings shed light on practical strategies for promoting service innovation. While organizations might be constrained by great competitive pressures, forming and managing collaborative relationships with peer organizations can help to buffer the negative impact of pernicious competition.

Section 2 lays out the theoretical framework of coopetition. Discussion on key expectations follows, showing how innovation varies along with interorganizational competition and collaboration. Sections 3 to 5 focus on empirically exploring the joint effects of competition and collaboration on the adoption of different forms of health care innovation, including the adoption of high-cost new medical technology, relatively low-cost service innovation that improves the accessibility of service, and patient-centered payment innovation incentivized by the ACA. Section 6 summarizes key findings, makes recommendations for future research on interorganizational dynamics, and concludes with practical implications on how to manage innovation in competitive environments.

2 The Theoretical Framework of Coopetition

Being at the forefront of effective policymaking and public service delivery, frontline service organizations produce and deliver social services to citizens in a wide range of policy domains, such as education, welfare, health, and human services. These organizations also translate numerous federal and state government grants into service innovation activities that directly affect policy outcomes and citizens' wellbeing (de Lancer Julnes and Gibson, 2016; Hicklin and Godwin, 2009).

The general topic of organizational behavior in innovation adoption has been an expansive research area in both the public and private management literature (Kimberley and Evanisko, 1981). There is a large literature embracing the theme that large service organizations, especially those in the public sector, are inertial. Pressman and Wildavsk's (1984) classic book on local implementation of federal policies shows the difficulty of bringing change to the frontline (Weick, 1979). Research and development (R&D) produce new policy ideas and technology innovations, which do not automatically transfer from laboratories of innovation to the field of implementation (Bozeman, 2000). Recent studies that focus on the frontline innovation adoption show a mixed picture about the fate of new ideas and technology in the public service sector (Maroulis, 2009). Reactive management strategies, in addition, also impede innovation. Some leaders of public organizations and nonprofit managers either react to policy reforms passively or try their best to buffer external environmental turbulence (Lynn, 2005; Meier and O'Toole, 2008; Weick and Sutcliffe, 2007). As leaders in these organizations often face the paradox of organizing and innovating, they could develop a risk-aversion mindset and to change (Kelman, 2005).

In spite of the barriers to change, scholars do find various innovation activities in a wide range of public service domains. There is a long-established view that organizations evolve and accept new ideas and technology according to changes in their external environment (Aldrich and Ruff, 2006). Leaders of service organizations can strategically manage the external environment (Akkerman and Torenvlied, 2011; Meier and O'Toole, 2001) and advocate public values (Johansen and LeRoux, 2013) through networking activities with external stakeholders and forming collaborative partnerships with peer organizations. These collaborative relationships thus can become the locus of innovation (Perry-Smith and Mannucci, 1997; Powell, Koput, and Smith-Doerr, 1996). As Perry-Smith and Mannucci (1997: 53) summarize, social networks and networking relationships have been increasingly used as a theoretical lens to study the conception of new ideas (knowledge creation) and the

implementation of new ideas (innovation adoption) (Baer, 2010; Burt, 2004; Uzzi and Spiro, 2005).

Much less is known, however, about how interorganizational collaboration and the external market environment may interactively affect service organizations' innovation. In the following subsection, I use the framework of coopetition to explore how horizontal relationships between organizations can be conceptualized based on the two distinct, yet interconnected dimensions: competition and collaboration. Of interest in this research is the adoption of innovation as organizational behavior, and how such innovation activity is linked to horizontal interorganizational relationships.

2.1 Coopetition: The Typology for Conceptualizing Horizontal Interorganizational Relationships

The practice of coopetition is far from being new in the business world. The volatile and uncertain market environment makes strategic alliances and collaboration with business competitors a widespread phenomenon in the private sector (Ritala, Golnam, and Wegmann, 2014). Devece et al. (2019) provide one of the most recent systematic literature reviews on coopetition in the private sector management literature. They point out that coopetition is particularly prevalent among small and medium-sized enterprises (SMEs), because they often coexist with other enterprises in a crowded marketplace, inherently weak in organizational capacity, and often face external constraints on revenue. Because of the widespread practice of coopetition among firms, this concept was first studied by business management scholars. It is widely accepted that Brandenburger and Nalebuff (1996) are the first authors who formalized the concept of coopetition in their game-theory model and case studies of firm strategies for survival and success. At its inception, the term is defined as collaboration with competitors (Devece et al., 2019), and has later been generalized to describe complex horizontal interorganizational relationships based on the interlock of cooperation and competition.

More recently, scholars in public management and nonprofit management began to find the concept of coopetition applicable to a variety of public and nonprofit service organizations, especially in areas such as education, health, and social services. Although direct competition for profit or operating margins is rare, public and nonprofit service organizations are facing increasing interorganizational competition for clients, specialized human capital, government funding, and private donors (Hu, Huang, and Chen, 2019; Moczulksa et al., 2019). Just as SMEs in the business world, public and nonprofit service organizations are often small and medium in size, face resource constraints, and need

to compete for survival in their local service areas. In a recent study in a homeless service delivery network, Hu, Huang, and Chen (2019) find that although networked service providers collaborate on service delivery, they *compete* for scarce resources such as government grants and private donations.

In many human and health service areas, public and nonprofit organizations also face cross-sector competition as private for-profits penetrate the local service market (Amirkhanyan, 2008). For example, in his analysis of nonprofit health care organizations, Tuckman (1998) finds that, in nonprofit marketplaces, nonprofit organizations not only compete with one another, but also compete with for-profit providers. Rivalry pressure from mixed markets has led to the commercialization of nonprofits. Meanwhile, many public and nonprofit service organizations are inherently knowledge intensive. The need for effective knowledge sharing in delivering services make collaborative episodes common in public and nonprofit sectors (Willem and Buelens, 2007). In health care and social service sectors, coopetition has gained increasing attention and been explored at the interorganizational level between different provider organizations (Gee, 2000; LeTourneau, 2004) and at the whole-network level (Peng and Bourne, 2009).

The competition perspective focuses on competitive relationships across organizations and recognizes the "invisible hands" of the market as a key feature of the external environment to organizations. The collaborative perspective, by contrast, emphasizes interdependence as the defining feature of the external environment. Neither approach, however, sufficiently describes the complex horizontal interorganizational relationships seen in the process of public service delivery. As Lado et al. (1997: 111) contend, a "syncretic model of competition and cooperation" is needed, and "some synergies of scholarship may be realized from the dynamic interplay between concepts of competition and cooperation." In their study of rent-seeking behavior, Lado et al. (1997) develop a two-by-two typology of different rent-seeking behavior based on the dimensions of interorganizational competition and cooperation. Lado's typology of rent-seeking behavior is well-suited to be generalizable to describe the four types of interorganizational relationship jointly defined by competition and collaboration. Figure 1 applies the Lado et al. (1997) typology to depict varying forms of interorganizational interactions. The same conceptualization also can be found in Stentoft, Mikkelsen, and Ingstrup's (2018) recent discussion on the "coopetition segments" model. In a nutshell, this typology framework classifies interorganizational relationships into four scenarios, depending on the interplay between competition and collaboration.

The first scenario is labeled as *isolated monopoly*, whereby an organization is a sole provider of certain public services in its local area, facing no

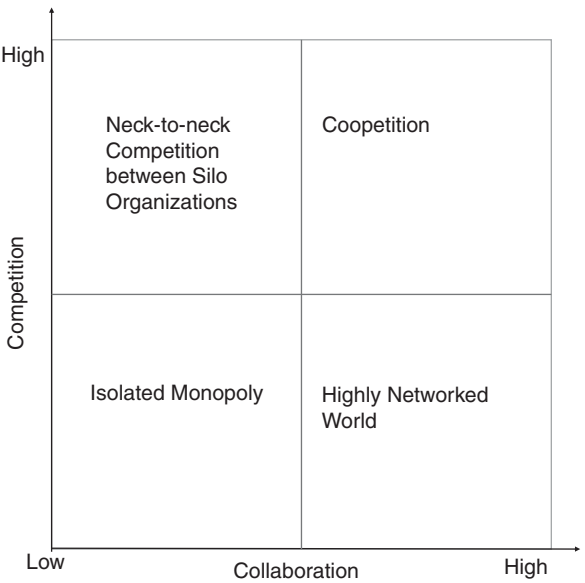

Figure 1 Conceptualizing horizontal inter-organizational relationships: competition, collaboration, and coopetition

competition from other service providers and having no collaborative partners. Isolated monopoly is not uncommon in public service delivery. In the American health care sector, for example, many rural hospitals serve as the sole provider of hospital care in their market area (Holmes et al., 2006). Isolated monopoly can occur not only based on geographic locations, but also can emerge due to the specific clients it serves. For example, health care providers in the USA often crowd in urban areas with high population density. Urban public safety hospitals could be monopolist providers to the low-income population and/or uninsured population. Veteran Affairs (VA) medical facilities represent another kind of monopoly – they exclusively serve the veteran population.

Interorganizational interactions increase as the number of service providers increases in the same area or for the same client population. Depending on the level of competition and collaboration, there could be three different scenarios: *highly networked world*, *neck-to-neck competition*, and *coopetition*. Highly networked world refers to strong reciprocal and collaborative relationships between organizations with very little tension of mutual competition. In this setting, collective interests and networking activities prevail. Guo and Acar (2005) recognize the prominent role of nonprofit organizations in urban public service delivery. They also demonstrate interorganizational collaboration, in its varying