SERVICE INNOVATION IN BUSINESS ECOSYSTEM: THE ROLES OF SHARED GOALS, COOPETITION, AND INTERFIRM POWER

ABSTRACT

A business ecosystem consists of a hub-firm (ecosystem leader) and a community of actor-firms. Building on the extended resource-based view and business ecosystem literature, this article explains the factors that contribute to an actor-firm's service innovation. To test our framework, we obtained 100 dyadic, time-lag responses from a tourism resort ecosystem in Indonesia. We found that coopetition is more valuable than shared goals in improving an actor-firm's service innovation. Coopetition is inefficient when the reward-mediated power is high, while shared goals are more beneficial when the non-mediated power is high. These findings indicate that hub-firms should exercise caution regarding their efforts to nurture shared goals, coopetition and interfirm power to promote service innovation. Overall, this study advances the extended resource-based view by highlighting that shared goals and coopetition allow an actor-firm to acquire important resources from its ecosystem relationships with other actor-firms to facilitate service innovation. More importantly, effective access to these relationship-based resources depends on interfirm power.

Keywords: Business Ecosystem; Service Innovation; Shared Goals; Coopetition; Interfirm Power

1. Introduction

As customer demands change and business competition intensifies, it becomes increasingly difficult for one firm to remain at the forefront in introducing new innovations. Creating a business ecosystem ("ecosystem", hereafter) may offer an important strategic option for firms and their partners when engaging in complex innovation (Endres, Huesig, & Pesch, 2022; Kang, Li, Cheng, & Kraus, 2021; Rong, Hu, Lin, Shi, & Guo, 2015). Essentially, an ecosystem is a loosely-interconnected network of firms with a hub firm (ecosystem leader) and a community of actors (actor-firm) (Bouncken & Kraus, 2022; Dhanaraj & Parkhe, 2006; Fernandes & Ferreira, 2021). It allows the hub- and actor-firms to access resources outside their organisational boundaries, thereby overcoming resource limitations and engaging in complex innovation (Bouncken & Kraus, 2022; de Vasconcelos Gomes, Facin, Salerno, & Ikenami, 2018; Endres *et al.*, 2022).

A review of the literature revealed two significant gaps. First, ecosystem collaborative arrangements, such as shared goals (a mutual understanding of how to achieve tasks and outcomes) and coopetition (simultaneous competing for market position and collaborating on value creation) (Adner & Kapoor, 2010; Liu & Rong, 2015), govern the dynamics of firms' behaviour and interactions, and are vital in creating a favourable ecosystem environment that fosters innovation activities (Adner, 2006; Kramer & Pfitzer, 2016). Although the existing literature emphasises the importance of these ecosystem collaborative arrangements in terms of affecting the actor-firms' product innovation outcomes, no study has examined their influence on service innovation outcomes. There exist substantial differences between product and service innovation due to the specific characteristics of services – intangibility, simultaneity and perishability (Hofmeister, Schneider, Kanbach, & Kraus, 2022; Lusch & Nambisan, 2015). It is, therefore, reasonable to expect that ecosystem collaborative

arrangements will influence the actor-firms' outcomes of service innovation in different ways, yet scholars provide little guidance on this issue.

Second, interfirm power refers to one firm's ability to control or influence the actions of another firm (Handley, de Jong, & Benton Jr, 2019; Yeung, Selen, Zhang, & Huo, 2009). In this study, we distinguish between rewards-mediated (promising something of value in exchange for compliance) and non-mediated interfirm power (influencing others without taking any action) (Benton & Maloni, 2005; Handley & Benton, 2012b). Previous studies have implicitly suggested that the presence of various types of interfirm power may have an impact on how firms deal with shared goals (e.g., Liu, Aroean, & Ko, 2022) and coopetition (e.g., Bouncken, Fredrich, Ritala, & Kraus, 2020) in their business relationships. Within an ecosystem, a hub-firm plays a vital role in orchestrating value-creation activities by leveraging its interfirm powers to govern the behaviour of the actor-firms (e.g., Jacobides, Cennamo, & Gawer, 2018; Williamson & De Meyer, 2012). Thus, it is possible that the exercise of rewards-mediated and non-mediated interfirm power by a hub-firm may impact the actor-firms' response to shared goals and coopetition within ecosystem relationships in different ways, ultimately affecting their commitment to service innovation. This is because these interfirm powers stem from different sources and represent opposing approaches to managing interfirm relations (Handley *et al.*, 2019). However, this perspective remains unexplored by scholars. To manage ecosystem relationships and performance, managers require such insights to exercise different interfirm powers.

Using the extended resource-based view (ERBV) and business ecosystem literature, we develop a theoretical framework (see Figure 1) and test it using 100 dyadic surveys collected from a marina resort ecosystem in Indonesia. In several ways, we contribute to the existing literature. First, we contribute to the literature on ecosystem collaborative arrangements (Adner, 2017; Baron, Patterson, Maull, & Warnaby, 2018; Chandler, Danatzis,

Wernicke, Akaka, & Reynolds, 2019) by simultaneously examining the effects of shared goals and coopetition on the actor-firms' service innovation. Second, we advance the research on ecosystem governance (Jacobides *et al.*, 2018; Williamson & De Meyer, 2012) by considering interfirm power – reward-mediated power and non-mediated power – as a pivotal mechanism for determining the effects of shared goals and coopetition on the actor-firms' service innovation. Overall, this paper provides new insights into service innovation in the ecosystem (Annanperä, Liukkunen, & Markkula, 2015; Rohrbeck, Hölzle, & Gemünden, 2009).

"Insert Figure 1 Here"

2. Theory and Hypotheses

2.1 Literature Background

The ecosystem concept has recently attracted increasing scholarly attention (Kang *et al.*, 2021). Jacobides *et al.* (2018) identify three groups of studies. One group explores how an individual firm within an ecosystem interacts and works with others to gain mutual effectiveness. The research in this group emphasises the "shared fate" of the ecosystem community, and that individual firms' survival depends on the ecosystem performance (e.g., Bouncken & Kraus, 2022; Fernandes & Ferreira, 2021). For example, Parente, Rong, Geleilate, and Misati (2019) demonstrate how a Chinese state-owned MNE sustains its operations in Africa by engaging in collective action and coevolving with its key stakeholders. Williamson and De Meyer (2012) outline approaches to organising ecosystem partnerships so companies can leverage ecosystems to deliver complex solutions. Building on this work, researchers have further discussed the role of the hub-firm in facilitating the actor-firms' interactions as a means of improving ecosystem performance (e.g., Dhanaraj & Parkhe, 2006; Liu *et al.*, 2022).

The second group of studies deal with the concept of the "platform" – technology that enables open-source sharing (De Reuver, Sørensen, & Basole, 2018). Specifically, researchers explore the processes which allow the actor-firms to participate and compete in the platform ecosystem by developing complements/products based on the same technical standards (e.g., Ceccagnoli, Forman, Huang, & Wu, 2012). This extant research has also explored mechanisms such as selective promotion (Rietveld, Schilling, & Bellavitis, 2019), generativity (Cennamo & Santaló, 2019) and others (e.g., McIntyre & Srinivasan, 2017; Tiwana, Konsynski, & Bush, 2010), which support the design and effective management of the platform ecosystem. Ultimately, the goal is to increase the value of the platform.

The last group consists of research focusing on the relationship between the ecosystem and innovation activities (de Vasconcelos Gomes *et al.*, 2018; Klimas & Czakon, 2021). It emphasises two research angles: 1) the individual ecosystem firm's strategies for interacting with others and participating in innovation activities (e.g., Beliaeva, Ferasso, Kraus, & Damke, 2019; Dedehayir, Mäkinen, & Ortt, 2018); and 2) how different ecosystem collaborative arrangements, such as structure configuration (e.g., Adner, 2017; Chandler *et al.*, 2019), sharing/exchanging mechanisms (e.g., Baron *et al.*, 2018) and others, can affect the innovation outcomes. Our study is situated within this research group, but is unique in several respects. First, we focus specifically on service innovation. The extant literature emphasises the role that business ecosystems play in product innovation (e.g., Adner & Kapoor, 2010; Liu & Rong, 2015), but few studies investigate how it affects service innovation (e.g., Annanperä *et al.*, 2015; Rohrbeck *et al.*, 2009). Second, we simultaneously examine the influence of coopetition and shared goals. These two crucial yet distinctive ecosystem collaborative arrangements are vital to forming and maintaining the business ecosystem (Ansari, Garud, & Kumaraswamy, 2016; Kramer & Pfitzer, 2016). To date, researchers have only tested the effect of shared goals (Kramer & Pfitzer, 2016; Liu & Rong,

2015) or coopetition (Ansari *et al.*, 2016; Kapoor & Lee, 2013) on product innovation (but not service innovation) in separate studies. Third, we pay attention to the interfirm power exercised by the hub-firm as an important boundary condition that influences the effectiveness of ecosystem collaborative arrangements. This is in keeping with previous ecosystem research, which stressed the importance of interfirm power in determining how ecosystem participants collaborate (Ansari *et al.*, 2016; Liu *et al.*, 2022). Together, this research advances this research strand by exploring the impact of coopetition and shared goals on service innovation, as well as the contingency of interfirm power.

2.2 Ecosystem Collaborative Arrangements and Service Innovation

We anchor our study in ERBV. According to the traditional resource-based view, internal resources support a firm's value-creating activities, which are the critical drivers of superior performance. ERBV extends this theory by suggesting that a firm can access resources outside its organisational boundaries to support its value-creating activities (Squire, Cousins, & Brown, 2009). Building on the insights of ERBV, we argue that service innovation is a value-creating activity, that requires a firm to access external resources to support its implementation (Berman, Cano-Kollmann, & Mudambi, 2022; Wang & Chen, 2022). In comparison to product innovation, Nijssen, Hillebrand, Vermeulen, and Kemp (2006) suggest that service innovation has several unique features. First, service development must go hand in hand with service delivery process modification. Second, the fit between the service and existing systems (e.g., communication, operations, etc.) is more critical than in a product-manufacturing context. Third, R&D investment is more strongly linked to successful product innovation than service innovation. These unique features demonstrate that the essence of service innovation is not simply the service itself. Instead, service innovation involves a chain of activities that may require access to the resources of the business partners

in order to produce and deliver new or modified services (Berman *et al.*, 2022; Nasution, Mavondo, Matanda, & Ndubisi, 2011).

In this research, we examine the effects of ecosystem collaboration arrangements on service innovation. This consideration builds on ERBV, which argues that firms can access resources from their partners if specific mechanisms facilitate their business collaboration (Li, Poppo, & Zhou, 2010; Squire *et al.*, 2009). As such, ecosystem collaboration arrangements may be regarded as mechanisms through which the firms within an ecosystem can access each other's resources and engage in value-creating activities (e.g., innovation) (Adner, 2006; Jacobides *et al.*, 2018). Furthermore, the previous ecosystem literature also implicitly emphasised the importance of different ecosystem collaboration arrangements concerning facilitating firms' resource sharing and interaction, which in turn fosters service innovation (e.g., Annanperä *et al.*, 2015; Wang & Chen, 2022). To give some illustrations, Zhong and Nieminen (2015) investigate how Chinese providers use the ecosystem to develop innovative mobile payment services. Service innovation results from different strategies for orchestrating inter-organisational co-innovation. Baron *et al.* (2018) study how FareShare (a leading UK actor in the fight against food wastage) uses institutional tools (e.g., norms, rules, symbols, etc.) and technology (i.e., the FoodCloud app) to manage service innovation in the food waste ecosystem.

This study focuses on two crucial ecosystem collaborative arrangements: coopetition and shared goals. Collaboration allows the actor-firms to integrate multiple resources when developing new capabilities, while the competitive intensity forces them to manage their resources more effectively (Kapoor & Lee, 2013; Ritala, Golnam, & Wegmann, 2014). Together, coopetition allows the actor-firms to influence each other's development and self-renewal. Drawing on ERBV, we anticipate a positive relationship between coopetition and an actor-firm's service innovation, for several reasons. First, competing firms are likely to

possess complementary resources and knowledge (Cortese, Giacosa, & Cantino, 2021; Ritala, 2012). Several studies have shown that firms can generate innovative ideas by combining diverse resources and knowledge (Adner & Kapoor, 2010; Dhanaraj & Parkhe, 2006). Collaboration among competing firms offers them many opportunities to combine their resources and knowledge (Cortese *et al.*, 2021; Fredrich, Bouncken, & Kraus, 2019), which fosters innovations. Adapting these insights to this study's context, cooperation allows an actor-firm to access service-supporting resources and firm-specific service knowledge from the other ecosystem participants. Based on novel combinations of diverse service-related resources, an actor-firm is expected to generate innovative ideas for service development or improvement (Cortese *et al.*, 2021; Fredrich *et al.*, 2019; Wang & Chen, 2022).

Second, firms may identify innovation opportunities through their interactions with their business partners (Ritala, 2012), but are unlikely to pursue these, due to the risks and resource investments involved (Park, Srivastava, & Gnyawali, 2014; Wang & Chen, 2022). It has been shown that, under conditions of coopetition, competing firms are motivated to maximise their private benefits arising from collaboration and focus more on innovation (Park *et al.*, 2014; Wang & Chen, 2022). We apply these insights to this study's context. We argue that collaboration allows an actor-firm to gain an awareness of the innovation opportunities through knowledge sharing with the other ecosystem participants. There is a higher probability that an actor-firm will intensify its efforts to seize opportunities when there is intense competition among ecosystem participants. Combining the above arguments, we hypothesise:

> ***Hypothesis 1:*** *There is a positive relationship between coopetition and service innovation in the ecosystem context.*

Shared goals reflect a mutual understanding of the approach and vision for achieving tasks and outcomes (Li *et al.*, 2010). This ecosystem collaborative arrangement is essential

for forming an ecosystem, given that ecosystems are loosely coupled coalitions of firms that are autonomous in some respects (Dhanaraj & Parkhe, 2006; Parente *et al.*, 2019). One of the key motives for bringing actor-firms and the hub-firm together is a common set of goals (i.e., to develop new products or services) (Liu & Rong, 2015). Drawing on ERBV, we also expect shared goals to enhance an actor-firm's service innovation outcomes. On the one hand, the shared goals among actor-firms can help an ecosystem to channel knowledge and resources to aid service innovation projects. Having shared goals allows the actor-firms to focus more on the ecosystem-level outcomes, regardless of differences and disagreements between them (Jap, 2001; Li *et al.*, 2010), and so are more willing to share their knowledge and resources. When an actor-firm possesses more knowledge about the expectations of the other ecosystem participants, this deeper understanding will allow it to anticipate the operational challenges more effectively when engaging in collaborative service innovation projects and readily transfer knowledge and resources to overcome those challenges.

On the other hand, the high level of shared goals among the actor-firms motivates them to support service innovation projects. The presence of shared goals helps an actor-firm recognise that working with its ecosystem partners can enhance its competitiveness and their joint competitive position in the marketplace (Liu & Rong, 2015; Rong *et al.*, 2015). Moreover, goals determine what an actor-firm expects from a specific business outcome, such as developing a new service or modifying an existing one. When many actor-firms have a mutual understanding of how to achieve this business outcome, they are more likely to support its realisation (e.g., devote resources to service innovation projects). All in all, these arguments suggest the following:

> ***Hypothesis 2:*** *There is a positive relationship between shared goals and service innovation in the ecosystem context.*

2.3 Hub-Firm and Interfirm power

The prior work has demonstrated the critical role of the hub-firm within an ecosystem (Dhanaraj & Parkhe, 2006; Liu & Rong, 2015). Dedehayir *et al.* (2018) reviewed 60 scholarly articles and found that the hub-firm is (or "a hub-firm would be") responsible for ecosystem governance. One way a hub-firm can coordinate the interactions and orchestrate the resource flows among the actor-firms is through the use of interfirm power (Jacobides *et al.*, 2018; Liu *et al.*, 2022; Williamson & De Meyer, 2012). This research proposes that an actor-firm's perception of interfirm power can affect its interactions with the other ecosystem participants (based on ecosystem collaborative arrangements), thereby influencing its engagement in service innovation. This consideration also builds on the ERBV. The ERBV explains how the relationships (i.e., collaborative arrangements) among the firms in a network (i.e., a business ecosystem) can influence value-creating activities. Furthermore, it also contains insights into the contingency factors that might affect this relationship's value (Li *et al.*, 2010; Squire *et al.*, 2009). Research on ecosystems has explicitly and implicitly indicated that hub-firms use interfirm power to influence the actor-firms' behaviour (Liu *et al.*, 2022). To give some illustration, Ansari *et al.* (2016) found that hub-firms used both soft power (i.e., social skills) and hard power (i.e., threats and sanctions) to obtain actor-firm compliance. Williamson and De Meyer (2012) examine several technology ecosystems and observe how hub-firms (such as IBM, Apple, Microsoft, etc.) use power (although the type of power is unspecified) to impose their choices on the actor-firms. According to these studies, an actor-firm's perceptions of the hub-firm's power can influence its attitudes and response actions to the ecosystem collaborative arrangements that guide its behaviour.

Drawing on the previous interfirm power research (Benton & Maloni, 2005; Yeung *et al.*, 2009), we conceptualise two types of interfirm power as moderators in our framework: reward-mediated power and non-mediated power. Mediated power is the use of competitive approaches to manipulate others' behaviour (Benton & Maloni, 2005; Handley *et al.*, 2019).

Rewards-mediated power is a type of mediated power in which the power source (i.e., the hub-firm) can influence the target firms (i.e., the actor-firms) by rewarding them with something of value in exchange for their compliance (Handley & Benton, 2012b). The prior ecosystem literature suggests that a hub-firm often uses rewards-mediated power to promise something of value (e.g., marketing endorsements) to motivate the actor-firms to perform certain tasks (Cennamo & Santaló, 2019; Williamson & De Meyer, 2012).

We expect that reward-mediated power may weaken the relationship between coopetition and service innovation. The presence of rewards may intensify the competition among the ecosystem participants. This is because, in such a situation, they are now competing not only for new service offers, but also for rewards from the hub-firm (Handley & Benton, 2012a; Zhao, Huo, Flynn, & Yeung, 2008). Thus, the collaboration among the ecosystem participants will be more calculated. They will only agree to share knowledge and resources when specific service innovation projects bring rewards. An actor-firm is less likely to access resources and knowledge from others in order to engage in service innovation projects that do not elicit rewards from the hub-firm. As the reward-mediated power grows, the beneficial effect of coopetition on service innovation declines. Thus,

> ***Hypothesis 3:*** *Reward-mediated power weakens the positive relationship between coopetition and service innovation in the ecosystem context.*

Rewarding target firms improve their commitment to the power source (reward provider) (Clauss & Bouncken, 2019; Zhao *et al.*, 2008). A target firm will be more likely to perform as expected by the power source, due to 1) the target firm feeling obliged to reciprocate rewards, and 2) the target firm realising that it is in its best interest to be compliant, and so it continues to receive rewards. As a result, the target firm may be less willing to support other firms that do not offer rewards (Zhao *et al.*, 2008). Based on these insights, we expect reward-mediated power to weaken the positive relationship between

shared goals and service innovation. Our expectation is that the perception of the hub-firm's reward-mediated power will enhance an actor-firm's incentive to build and maintain its relationship with the hub-firm. It also means that the actor-firm will invest less in building relationships with the other ecosystem participants since they become less important business partners when the rewards-mediated power is high. As a result, the actor-firm will be less able to access knowledge and resources from the other ecosystem participants when engaging in service innovation projects. Therefore, we conclude that shared goals have less benefit as the reward-mediated power increases, and thus, we propose the following:

> ***Hypothesis 4:*** *Reward-mediated power weakens the positive relationship between shared goals and service innovation in the ecosystem context.*

Non-mediated power focuses on using relational influence to affect others' behaviour (Clauss & Bouncken, 2019; Handley & Benton, 2012b). Non-mediated power inspires voluntary compliance by others, as they believe that the power source (i.e., the hub-firm) is an expert (e.g., possesses more technological know-how) and feel proud to be associated with it. The prior research shows that firms join ecosystems because they wish to connect with/identify with the hub-firm (e.g., brand recognition) (Cennamo & Santaló, 2019; Liu & Rong, 2015) and access valuable knowledge from the hub-firm (Dhanaraj & Parkhe, 2006). Non-mediated power influences the target firm's behaviour through two social processes: identification and internalisation (Handley & Benton, 2012a). Using these two processes, we will argue for the moderating roles of non-mediated power.

In our view, non-mediated power strengthens the relationship between coopetition and service innovation. An identification process refers to the target firm's desire to maintain a satisfying, self-defining relationship with the power sources (Handley & Benton, 2012a). The presence of high levels of non-mediated power in a business network indicates that many firms (i.e., target firms) consider collaborating with a specific power source (within such a

network) beneficial. In the ecosystem context, the ecosystem participants are more willing to invest in developing a good relationship with the hub-firm as the non-mediated power increases. They are keen to share knowledge and resources with one another in order to maintain their involvement in the ecosystem. In such a situation, an actor-firm is more likely to access knowledge and resources from the other ecosystem participants. As a result, an actor-firm has more opportunities to combine various service-related resources and knowledge, facilitating service innovation. Thus,

> ***Hypothesis 5:*** *Non-mediated power strengthens the positive relationship between coopetition and service innovation in the ecosystem context.*

Moreover, non-mediated power strengthens the relationship between shared goals and service innovation. An internalisation process occurs when a target firm accepts a power source, because it aligns with the target firm's values (Handley & Benton, 2012a). Consequently, the target firm wishes to work with the power source. In our context, non-mediated power facilitates the internalisation process (Handley & Benton, 2012a), which enhances the ecosystem participants' recognition that they share similar beliefs and behaviour with the hub-firm. At the same time, shared goals are related to similar beliefs and behaviour among the ecosystem participants (Liu *et al.*, 2022). Fang, Lee, Palmatier, and Guo (2016) suggest that the sharing of knowledge and resources in a business network (i.e., an ecosystem) is more effective when both the vertical (e.g., between the hub-firm and the actor-firms) and horizontal relationships (e.g., among the actor-firms) share similar beliefs and behaviour. The presence of both conditions indicates that an actor-firm is more likely to access knowledge and resources from the other ecosystem participants to enhance service innovation projects. Thus, we hypothesise the following:

> ***Hypothesis 6:*** *Non-mediated power strengthens the positive relationship between shared goals and service innovation in the ecosystem context.*

3. Research Method

3.1 Research Context

The empirical context of this study features a tourism resort ecosystem in Indonesia. First, the tourism industry is dominated by resorts that offer a wide range of services (such as accommodation, restaurants, entertainment, etc.) to the end-customers (Rusko, Kylänen, & Saari, 2009). Second, tourist resorts do not operate in isolation but, rather, within an ecosystem of suppliers (actor-firms) who provide a range of services and/or support (Rusko *et al.*, 2009). The tourist resorts (the hub-firms) orchestrate suppliers' efforts and provide comprehensive services to their end-customers. Third, tourism is increasingly involved in innovation projects that aim to introduce new services or modify the existing ones to meet the changing end-customer needs (Saputra, 2019). Finally, Indonesia's tourism industry is one of the fastest-growing sectors. Governments, business practitioners and local communities are keen to explore creative new approaches to developing innovative services, such as culture-based storynomics tourism and tourist villages (Saputra, 2019). All tourist resorts in Indonesia benefit from this service innovation trend.

Our sample frame is an Indonesian tourist resort (let us call it 'Resort ABC' for confidentiality reasons). Resort ABC is a large, integrated beach recreation and marina resort complex in North Jakarta, Indonesia's capital. It offers various attractions (such as beaches, theme park, water park, ocean park, ecological park, golf course and art market) with specialised service offers (e.g., restaurants, tourist transportation to nearby islands, etc.) to cater for the end-customers' needs. Resort ABC also offers hotel accommodation as well as meeting, incentive, convention and exhibition (MICE) facilities with built-to-order service offers (e.g., beverages, entertainment, etc.). As one of Southeast Asia's leading tourist resorts, Resort ABC is similar to Disneyland. Its ecosystem has around 1,200 active suppliers (actor-firms).

3.2 Measurement and Data Collection

We took all of the measures from previous studies and then modified them based on interviews with practitioners (managers of Resort ABC and some of its suppliers). We developed two versions of the survey in order to collect dyadic responses. There are several variables on the "actor-firm survey" (a questionnaire for suppliers of Resort ABC), including cooperation, competition, shared goals, reward-mediated power, non-mediated power and control variables. We adopted the measures of cooperation and competition (four items each) from Shu, Jin, and Zhou (2017). We calculated the product term to assess the supplier's perception of the multiplicative interaction of cooperation and competition among Resort ABC's ecosystem participants. We adopted the measure of shared goals (four items) from Li *et al.* (2010) to assess the extent to which the supplier perceives a mutual understanding of the approach and vision for achieving the tasks and outcomes within Resort ABC's ecosystem. For reward-mediated power (three items) and non-mediated power (five items), we adapted the measures from Handley and Benton (2012b) and Handley *et al.* (2019). Reward-mediated power assesses the extent to which the supplier perceives Resort ABC's ability to promise something of value to it in exchange for its compliance. Non-mediated power assesses the extent to which the supplier perceives that Resort ABC is an expert and feels pride in its association with it. We measure the four variables above using a 7-point Likert scale (see Appendix 1).

The eight control variables that can potentially affect the service innovation outcomes are firm size, firm age, relationship length, transaction frequency, joint problem-solving, competitive intensity, market turbulence and strategic flexibility (service) (Lusch & Nambisan, 2015; Ordanini & Parasuraman, 2011). For firm size, firm age and relationship length, we asked the supplier to indicate the number of employees, years since the company's establishment and years of doing business with Resort ABC, respectively. For these three

variables, we applied log transformation to avoid extreme values and account for the diminishing marginal effects at the tail end. For transaction frequency, we asked the supplier to choose one of the following options (9 = more than twice a day, 8 = once a day, 7 = 1~5 times a week, 6 = 2~3 times a month, 5 = once a month, 4 = 5~10 times a year, 3 = 2~4 times a year, 2 = once a year and 1 = less than once a year) to indicate its business transaction patterns with Resort ABC. For joint-problem solving, we asked the supplier to indicate the extent to which it works together with others within Resort ABC's ecosystem (Jap & Ganesan, 2000).

Regarding competitive intensity, we asked the supplier to indicate the degree of competition (outside Resort ABC's ecosystem) in its industry (Wang, Li, Ross, & Craighead, 2013). For market turbulence, we asked the supplier to indicate the level of instability within its industry's customer preferences (Stock, Six, & Zacharias, 2013). We assessed these three variables using a single-item measurement (a 7-point Likert scale). Using Kortmann, Gelhard, Zimmermann, and Piller (2014), we adopted the measurement of strategic flexibility and modified it to fit the service provider context. By this measure, we assessed the supplier's ability to adapt to unanticipated situations and rapidly changing environments in constructing service strategies. On a 7-point Likert scale, we measured strategic flexibility using six items.

The "hub-firm" survey (the questionnaire for managers of Resort ABC) assesses the dependent variable – service innovation. We captured service innovation using a multi-item measurement (five items) on a 7-point Likert scale to assess the extent to which Resort ABC introduces services designed to meet an external user's or the market's needs. We adopted the measure from Nasution *et al.* (2011) and modified it to fit the ecosystem context.

One author and two Resort ABC senior managers, who are fluent in both languages, translated the questionnaire from English into the domestic language, Bahasa Indonesia. Three staff members pilot-tested the translated questionnaire to avoid misunderstandings. The

pilot tests enabled further revisions, leading to the final version that was used for the primary data collection. We adopted a two-step process to collect the data. While Resort ABC has approximately 1,200 active suppliers (actor-firms), not all are involved in supply services. Assisted by Resort ABC executives, we identified 384 service suppliers who had received task orders related to services (e.g., entertainment) in the last five years. In Time 1, we distributed the actor-firm survey via Resort ABC. All 384 suppliers received an introduction letter about our research and a questionnaire, followed by a reminder phone call. In the end, 106 suppliers agreed to participate in our study and returned their responses to us via Resort ABC. In Time 2 (three months after the actor-firm survey was received in Time 1), we distributed the "hub-firm" survey to Resort ABC's managers, who are responsible for dealing with the 106 suppliers. We asked Resort ABC's managers to assess the service innovation outcomes of each of the 106 suppliers. In the end, we collected 106 responses. We then combined these two surveys and deleted six incomplete questionnaires. The one hundred dyadic responses resulted in an effective response rate of 26.04%. We believe that these responses are highly representative based on two reasons. First, we reached out to all of Resort ABC's active service suppliers. Second, according to Baruch and Holtom (2008), low survey response rates are typical when conducting an organisational-based survey, and nonresponses do not necessarily imply sampling bias. Our study's effective response rate is comparable to other dyadic, time-lag surveys (e.g., Squire *et al.*, 2009). The 100 suppliers in our final sample for analysis have an average of 85.91 employees, 16.07 years of (firm) age and a collaborative relationship with Resort ABC of 5.62 years.

3.3 Validity and Reliability

Using the following approaches, we assessed the measurements' validity and reliability. Confirmatory factor analysis (CFA) involves identifying factors in a set of

observed variables (Hair, Black, Babin, & Anderson, 2010). We undertook CFA to verify the factor structure (X^2 = 355.453; *df* = 234; p-value < 0.000; Comparative Fit Index [CFI] = 0.931; Root Mean Square Error of Approximation [RMSEA] = 0.072). A statistically significant X^2 could indicate misspecification in the model. As a result, we further investigated the residuals matrix and modification indices. Our results showed that only 1 covariance (out of the 406) exceeded the 2.58 threshold value suggested by Byrne (2016) when examining the standardised residuals matrix. Furthermore, all modification indices were below the 10 threshold value (Byrne, 2016). Other fit indices, such as the CFI (above 0.900) and RMSEA (below 0.100), also met the fit requirements (Hair *et al.*, 2010). Accordingly, CFA suggests that our factor structure was adequately fitted. Appendix 1 shows the factor loadings.

"Insert Table 1 Here"

To assess our measures' convergent and discriminant validity, we calculated the average value extracted (AVE) and the AVE's square root value, respectively (Hair *et al.*, 2010). The results showed that the AVE was greater than 0.50, and that the square root value of the AVE for each construct was greater than the construct's correlation with all of the other constructs (see Table 1). Thus, we confirm the construct's validity. To assess our measures' reliability, we calculated the value of the composite reliability (CR) (Hair *et al.*, 2010). Our results show that the CR was greater than 0.70 for all of the constructs, which confirms the construct's reliability.

To mitigate the common method variance (CMV), we obtained dyadic, time-lag responses from Resort ABC and its suppliers. Despite this, all of the respondents belong to the same tourism resort ecosystem. This means that CMV could still threaten the validity. We used multiple statistical remedies suggested by Podsakoff, MacKenzie, Lee, and Podsakoff (2003) to detect CMV. As a first step, Harman's single-factor test was applied to all of the

items in our study, and a single factor failed to explain the majority of the variance (28.566%). Furthermore, we used confirmatory factor analysis (CFA) to load all of the items onto a single factor in a CFA. We found that the fit statistic does not show a good fit (X^2 = 1373.654; *df* = 251; p-value < 0.000; CFI = 0.362; RMSEA = 0.213), which also indicated that a single factor does not account for all of the variance in the data. According to both results, common method variance is not a concern.

4. Analysis and Results

4.1 Main Findings

Our hypothesised model contains both linear and interaction effects. Therefore, according to Hair *et al.* (2010), the multivariance regression method is suitable for analysing the data and examining the hypotheses. Hypotheses 1 and 2 posit the positive effect of coopetition and shared goals on service innovation, respectively. According to Table 2, coopetition relates positively to service innovation (Model 1: β = 0.217, p < 0.050), but shared goals do not exhibit a significant positive relationship with service innovation (Model 1: β = 0.034, n.s.). These results support Hypothesis 1 but reject Hypothesis 2.

"Insert Table 2 Here"

Hypotheses 3 and 4 posit that reward-mediated power weakens the positive effect of coopetition and shared goals on service innovation, respectively. In Table 2, Model 2, the interaction between coopetition and reward-mediated power, is negative and significant (Model 2: β = -0.268, p < 0.050), whereas the interaction between shared goals and reward-mediated power is insignificant (Model 2: β = 0.017, n.s.). These results support Hypothesis 3 but reject Hypothesis 4. For greater clarity, we plot the relationship between coopetition and reward-mediated power in Figure 2a. Hypotheses 5 and 6 posit that non-mediated power strengthens the positive effect of coopetition and shared goals on service innovation,

respectively. In Table 2, Model 3, the interaction between coopetition and non-mediated power, is insignificant (Model 3: $\beta = 0.347$, n.s.), whereas the interaction between shared goals and non-mediated power is positive and significant (Model 3: $\beta = 0.622$, $p < 0.050$.). These results reject Hypothesis 5 but support Hypothesis 6. We plot the relationship between shared power and non-mediated power in Figure 2b.

"Insert Figure 2"

4.2 Endogeneity – Post-Hoc Analysis

Since our data are not derived from a randomised experiment, endogeneity may be a concern. As a result, we perform additional analysis to rule out endogeneity. We follow the approach of Jin, Zhou, and Wang (2016) to obtain the residuals of coopetition and shared goals that are free of hub-firm pressure and market uncertainty by regressing them against reward-mediated power, non-mediated power, competitive intensity and market turbulence. We then use the residuals of coopetition and shared goals as the independent variables. As before, we perform a multivariance regression analysis. As Table 2 shows (Models 4-6), the new results match our original results (Models 1-3). Thus, endogeneity is not a concern for our study.

5. Discussion

5.1 Theoretical Contributions

Our study makes several important theoretical contributions. First, it provides new insights into how coopetition and shared goals – two important collaborative arrangements that govern firms' behaviour and interactions concerning innovation activities (Adner & Kapoor, 2010; Liu & Rong, 2015) – affect the actor-firms' engagement in service innovation. We find that the effect of coopetition on service innovation is positive and significant, as predicted. However, our results also indicate that the impact of shared goals on service

innovation is insignificant. One possible explanation is that high levels of shared goals among firms can generate "groupthink" (or "isomorphism"), whereby the parties become too homogeneous in their thinking (Xie, Liang, & Zhou, 2016). Service innovation requires the input of novel ideas (Berman *et al.*, 2022; Hofmeister *et al.*, 2022). An actor-firm that has established high levels of shared goals with other ecosystem participants may not be able to draw new ideas from them, reducing its likelihood of coming up with innovative ideas for developing new services. This means that coopetition is more valuable than shared goals in improving an actor-firm's service innovation. In doing so, we extend the ecosystem research on innovation outcomes (e.g., Adner & Kapoor, 2010; de Vasconcelos Gomes *et al.*, 2018).

Our study is the first to empirically test coopetition and shared goals simultaneously in a single study about ecosystems. We are also the first to examine their influence on service innovation. Previous ecosystem studies have only tested the influence of either shared goals (Kramer & Pfitzer, 2016; Liu & Rong, 2015) or coopetition (Ansari *et al.*, 2016; Kapoor & Lee, 2013) on actor firms' participation in product innovation. This distinction is important because these two ecosystem collaborative arrangements demand different ecosystem relationship management priorities (Cortese *et al.*, 2021; Kramer & Pfitzer, 2016). Furthermore, these findings also advance ERBV, which recognises the value of a firm's external business relationships (Li *et al.*, 2010; Squire *et al.*, 2009). Both shared goals and coopetition describe the nature of an actor firm's relationship with external business partners (other ecosystem participants) within an ecosystem. Our findings suggest that researchers should discriminate between these two, rather than focusing on one or coupling them together, to understand the relationship between the ecosystem and service innovation. In doing so, we extend the application of ERBV to explain the value of interfirm relationships within an ecosystem.

Second, our study offers insights into how different types of interfirm power affect the relationship between ecosystem collaboration arrangements and service innovation. Our findings reveal that coopetition is inefficient when reward-mediated power is high. However, we did not find that reward-mediated power had a negative moderating effect on the relationship between shared goals and service innovation. One possible explanation is that the rewards offered by the hub-firms, despite their manipulative, instrumental nature (Zhao *et al.*, 2008), may incentivise competition among the actor-firms. The increase in competitive intensity within an ecosystem motivates an actor-firm to explore innovation opportunities and invest in service innovation projects (Park *et al.*, 2014; Rohrbeck *et al.*, 2009). Although it is not significant, the positive moderating effect of reward-mediated power on the relationship between shared goals and service innovation (Model 2: $\beta = 0.017$, n.s.) is in line with our explanation. Our findings also reveal that shared goals become more influential to service innovations when non-mediated power is high. However, we did not find a significant positive moderating effect of non-mediated power on the relationship between coopetition and service innovation. One possible explanation is that non-mediated powers reduce an actor-firm's competitive behaviours within the ecosystem (Handley & Benton, 2012a; Handley *et al.*, 2019), thereby simultaneously making the firm less motivated to search for and exploit service innovation opportunities. Thus, the presence of high levels of non-mediated powers reduces the positive influence of coopetition on an actor-firm's engagement in service innovation.

These findings advance the ecosystem literature (Jacobides *et al.*, 2018; Moore, 1993) by exploring the role of interfirm power. Previous studies have implicitly and explicitly suggested that the hub-firm can use interfirm power to affect an actor-firm's behaviour (Jacobides *et al.*, 2018; Liu *et al.*, 2022; Williamson & De Meyer, 2012). Our study represents an initial attempt to assess how the role of ecosystem collaborative arrangements

depends on interfirm power. Furthermore, we also advance the ERBV (Li *et al.*, 2010; Squire *et al.*, 2009) by identifying important contingency factors when studying the value of interfirm relationships within an ecosystem. In this manner, the ERBV may be applied to explain the interfirm power in ecosystem relationships. Our results show that the effects of coopetition and shared goals on service innovation can be strengthened or weakened under different types of interfirm power.

5.2 Managerial Implications

Our findings provide important implications for managers overseeing service innovation within an ecosystem. First, managers must distinguish between coopetition and shared goals and understand their roles in affecting service innovation outcomes. The conventional wisdom states that managers should pay more attention to promoting shared goals within an ecosystem (Kramer & Pfitzer, 2016; Liu & Rong, 2015). However, the results of our study indicate that coopetition has a greater impact on encouraging innovation with regard to services. Therefore, managers should strive to create and maintain an environment that encourages cooperative and competitive work when the ecosystem objectives are to develop new systems or modify the existing ones.

Second, managers need to be aware of the effects of interfirm power within an ecosystem. According to our findings, the beneficial effects of coopetition diminish when an actor-firm perceives high levels of reward-mediated power. As a consequence, managers should not use reward-mediated power when coopetition is the dominant collaborative arrangement within an ecosystem. On the other hand, our findings also suggest that the beneficial effects of shared goals increase when an actor-firm perceives high levels of non-mediated power. Thus, if shared goals constitute the dominant ecosystem collaborative arrangement, managers should consider using non-mediated power. We recommend that

managers selectively exercise different types of interfirm power when attempting to influence the actor-firms' behaviour under different ecosystem collaborative arrangements.

5.3 Limitations and Further Research

This study has several limitations that further research might address. First, our research design may raise concerns about common method bias. In this research, we attempted to minimise the potential bias by collecting dyadic, time-lag data from the hub-firm and its suppliers (the actor-firms). However, we still collected the data from the same tourist resort ecosystem. Researchers in the future might use time-series and objective data about multiple ecosystems to combat this limitation.

Second, we limited our investigation to a tourist resort in Indonesia (a single industry and country). Furthermore, our sample remains small, despite reaching all of the service suppliers in the ecosystem (384 service suppliers) and achieving a relatively high response rate (100 effective responses) for our data analysis. Thus, generalisability is a concern. Researchers in the future may wish to study different countries with large databases, which would help to generalise our findings and expand the boundary conditions.

6. Conclusion

Our study attempts to link ecosystem research with the new, challenging subject area of service innovation. The majority of the prior ecosystem research focuses on understanding firms' engagement in product innovation within an ecosystem (e.g., Adner & Kapoor, 2010; Liu & Rong, 2015). The rapid expansion of the service sector is inevitable, as we move from an agricultural to an industrial and, finally, to a service economy. Although practitioners are starting to leverage the benefits of the ecosystem to deliver sophisticated, comprehensive service solutions to the end-customers, field scholars have paid relatively little attention to

them. Due to the unique features of service innovation, we cannot readily transfer our understanding of the ecosystem and product innovation relationship to the context of service innovation. This lack of attention severely limits the generalisability of ecosystem theory. The current study develops a holistic framework that explains how coopetition and shared goals affect service innovation under the contingency of different types of interfirm power within an ecosystem. Our study provides only a snapshot of the forces that affect the actor-firms' engagement in developing new services and modifying the existing ones. However, combining our findings with previous ecosystem research studies can provide valuable insights for academics and practitioners concerning service innovation within an ecosystem. We hope that future researchers will continue to explore this subject area.

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Figure 1: Conceptual Framework

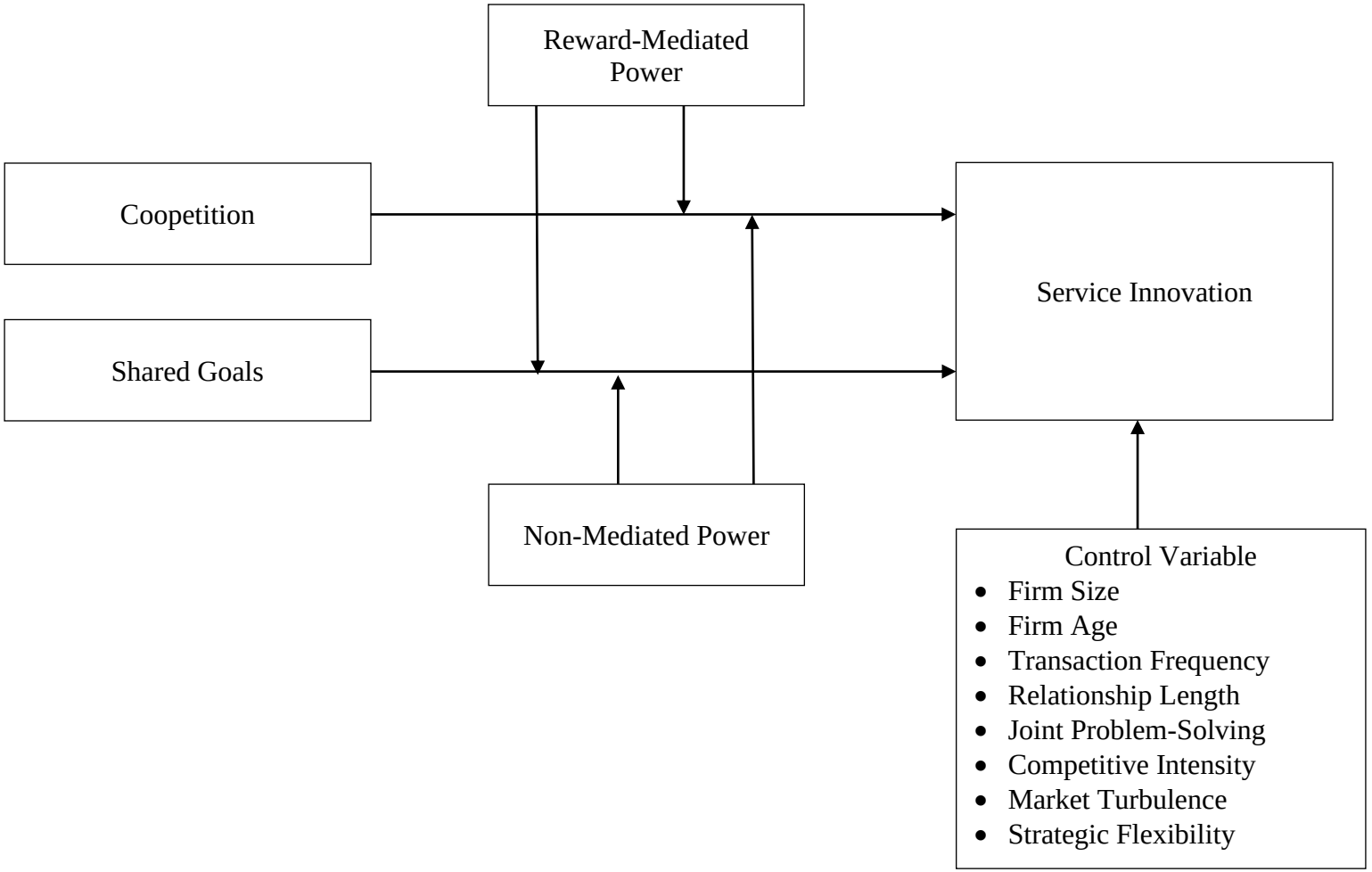


Table 1: Descriptive Statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Firm Size	---													
2. Firm Age	0.458*	---												
3. Relationship Length	0.204*	0.421*	---											
4. Transaction Frequency	-0.109	-0.021	0.180	---										
5. Joint Problem-Solving	-0.085	-0.050	0.110	0.016	---									
6. Competitive Intensity	0.023	0.020	-0.108	0.096	-0.016	---								
7. Market Turbulence	-0.028	-0.082	0.075	0.085	0.033	0.141	---							
8. Strategic Flexibility	0.044	0.092	0.020	0.022	0.471*	-0.085	0.122	---						
9. Cooperation	-0.012	-0.051	0.108	0.076	0.416*	-0.095	-0.068	0.380*	**0.752**					
10. Competition	0.043	-0.099	0.104	0.083	0.220*	-0.123	-0.036	0.369*	0.485*	**0.731**				
11. Shared Goals	-0.071	-0.010	0.127	0.090	0.713*	-0.007	0.139	0.439*	0.406*	0.294*	**0.831**			
12. Reward-Mediated Power	-0.120	-0.180	-0.064	0.025	0.183	-0.039	-0.078	0.206*	0.211*	0.330*	0.242*	**0.914**		
13. Non-Mediated Power	-0.079	0.002	0.134	-0.071	0.637*	-0.093	-0.012	0.308*	0.417*	0.211*	0.662*	0.002	**0.800**	
14. Service Innovation	0.110	-0.040	0.097	0.127	0.158	-0.289*	0.072	0.087	0.012	0.047	0.110	0.033	0.011	**0.834**
Mean	1.384	1.079	0.511	2.930	6.170	5.460	3.840	5.878	5.410	4.873	6.148	3.900	5.845	5.626
Standard Deviation	0.551	0.363	0.449	1.628	0.829	1.366	1.383	0.933	1.113	1.240	0.794	1.798	0.902	0.768
Composite Reliability	---	---	---	---	---	---	---	---	0.830	0.816	0.896	0.938	0.875	0.919
Average Variance Extracted	---	---	---	---	---	---	---	---	0.565	0.534	0.690	0.835	0.640	0.696

Notes:
N = 100; *p < 0.05
Average variance Extracted (AVE) square roots are shown in bold on the correlation matrix diagonal

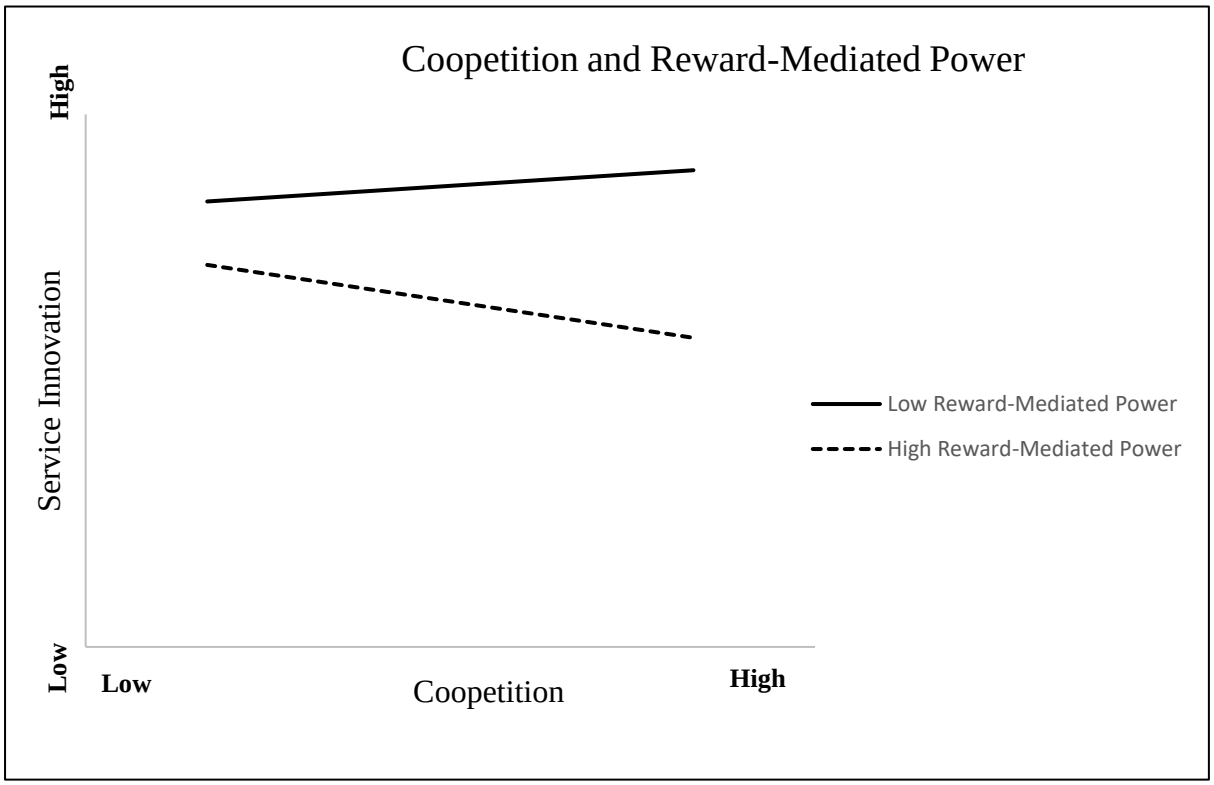
Table 2: Results

		Main Findings			Post-Hoc Analydsis		
		Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Controls							
Firm Size		0.170(1.571)	0.138(1.250)	0.139(1.293)	0.170(1.571)	0.160(1.485)	0.162(1.500)
Firm Age		-0.073(-0.609)	-0.079(-0.649)	-0.062(-0.524)	-0.073(-0.609)	-0.100(-0.834)	-0.093(-0.774)
Relationship Length		-0.014(-0.126)	-0.010(-0.090)	-0.068(-0.604)	-0.014(-0.126)	0.003(0.027)	-0.054(-0.473)
Transaction Frequency		0.167(1.654)	0.172(1.725)†	0.200(2.012)*	0.167(1.654)	0.169(1.699)†	0.193(1.916)†
Joint Problem-Solving		0.284(1.893)†	0.331(2.143)*	0.357(2.393)*	0.284(1.893)†	0.299(1.983)*	0.361(2.350)*
Competitive Intensity		-0.306(-3.076)**	-0.303(-3.067)**	-0.365(-3.654)***	-0.332(-3.361)**	-0.306(-3.101)**	-0.351(-3.541)**
Market Turbulence		0.093(0.919)	0.086(0.862)	0.117(1.172)	0.087(0.876)	0.081(0.822)	0.133(1.315)
Strategic Flexibility		0.033(0.278)	0.095(0.745)	0.040(0.344)	0.033(0.278)	0.112(0.864)	0.067(0.565)
Main Effects							
Coopetition	**H_1**	0.217(1.999)*	0.108(0.878)	0.040(0.302)			
Shared Goals	**H_2**	0.034(0.215)	0.058(0.370)	0.181(1.050)			
Coopetition $_{Residual}$					0.207(1.999)*	0.125(1.101)	0.125(1.076)
Shared Goals $_{Residual}$					0.023(0.215)	0.023(0.213)	0.093(0.779)
Reward-Mediated Power		-0.028(-0.266)	0.039(0.357)	-0.038(-0.368)	-0.029(-0.286)	-0.031(-0.300)	0.008(0.078)
Non-Mediated Power		-0.143(-1.006)	-0.194(-1.356)	-0.250(-1.680)†	-0.182(-1.354)	-0.188(-1.383)	-0.193(-1.337)
Interactions							
Coopetition x Reward-Mediated Power	**H_3**		-0.268(-2.013)*				
Shared Goals x Reward-Mediated Power	**H_4**		0.017(0.151)				
Coopetition x Non-Mediated Power	**H_5**			0.347(1.609)			
Shared Goals x Non-Mediated Power	**H_6**			0.622(2.501)*			
Coopetition $_{Residual}$ x Reward-Mediated Power						-0.229(-1.945)*	
Shared Goals $_{Residual}$ x Reward-Mediated Power						-0.026(-0.240)	
Coopetition $_{Residual}$ x Non-Mediated Power							0.151(0.980)
Shared Goals $_{Residual}$ x Non-Mediated Power							0.360(1.969)*
Model Summary							
F-Value		2.081	2.119	2.332	2.365	2.092	2.101
P-Value		0.026	0.018	0.009	0.023	0.020	0.019
R-Square		0.223	0.259	0.278	0.223	0.256	0.257
Adjusted R-Square		0.116	0.137	0.159	0.116	0.134	0.135

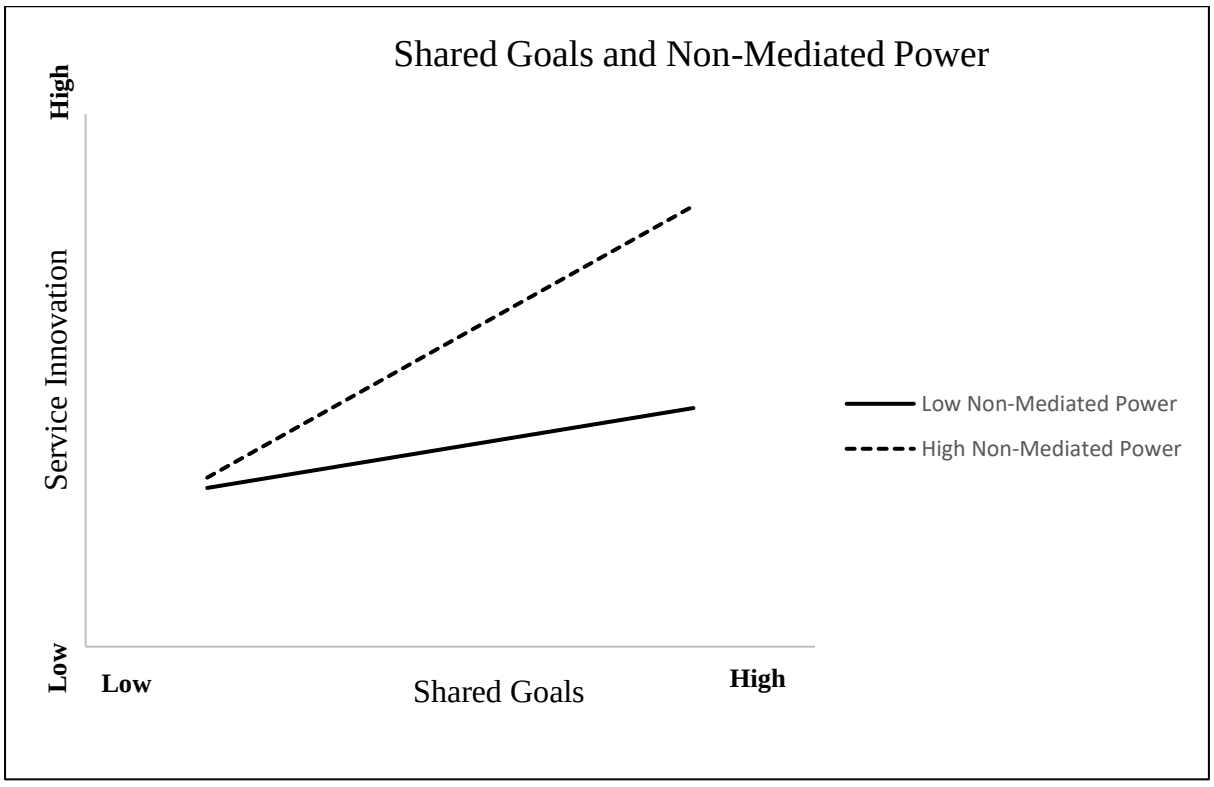
Note:
*** $p < 0.001$; ** $p < 0.010$; * $p < 0.050$; † $p < 0.100$
Dependent variable = Service innovation
Standardised coefficients are reported with t-value in parentheses
Coopetition $_{Residual}$ = Coopetition – Coopetition $_{Predicted}$
Shared Goals $_{Residual}$ = Shared Goals – Shared Goals $_{Predicted}$

Figure 2. Graphical Representation

(a)



(b)



Appendix 1: Factor Loadings

Measurement	Loading
Questionnaires completed by Resort ABC's (The Hub-Firm's) suppliers	
Reward-Mediated Power	
Resort ABC offers incentives to "us" when "we" are initially reluctant to cooperate with a new program*.	0.975
Resort ABC will favor us on other occasions if we go along with their requests.	0.960
Resort ABC offers us rewards so we will go along with their wishes.	0.795
Non-Mediated Power	
We admire the way that Resort ABC runs its business.	0.774
We talk up Resort ABC to our partners as a great business with which to be associate.	0.670
We see Resort ABC as an expert in their industry.	0.843
We respect the judgment of Resort ABC's representatives.	---
We believe that Resort ABC retains business expertise that makes them likely to suggest the proper thing to do.	0.895
Cooperation	
We share information frequently with other suppliers that provide services to Resort ABC.	0.686
We cooperate closely to make sure Resort ABC will last a long time.	0.860
We contribute sufficient technological and management know-how to Resort ABC.	0.917
Problems that arise in Resort ABC are treated by us as joint, rather than individual responsibilities.	0.456
Competition	
We try to gain more strategic importance and power against each other when working in partnership with Resort ABC.	0.544
We try to protect its turf is considered to be a way of life when working in partnership with Resort ABC	0.649
We guard proprietary customers or technology information.	0.900
We try to protect our own business networks to be exposed to each other.	0.781
Shared Goals	
We in this (ecosystem) relationship are enthusiastic about pursuing the collective goals	0.812
We are committed to improvements that may benefit the relationship as a whole, and not only the individual firm	0.585
We share the same ambition and vision	0.940
In most aspects of the relationship, we are jointly responsible for getting things done	0.936
Questionnaires completed by Resort ABC (The Hub-Firm)	
Service Innovation	
This supplier has introduced many new services to the market	0.872
This supplier has introduced many modifications to the existing services	0.896
This supplier constantly seeks find new services	0.851
This supplier has introduced more new services than other firms that offers similar services	0.795
The new services this supplier introduced have caused significant changes in the industry	0.750

Note:
--- Items deleted due to low factor loading
The real name of Resort ABC is used in the actual survey.
* "we" and "us" (pronouns) used in this survey refers to "the focal firm (supplier) and the other Resort ABC's suppliers" in this survey.