



Enhancing value co-creation in professional service projects: The roles of professionals, clients and their effective interactions

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Abstract

Projects are value creation mechanisms for organizations. In this paper, we build on service-dominant logic theory to theorize how value is perceived and co-created by service providers and clients in professional service projects. From two studies, we found that for service providers to create their value, particularly non-monetary value (e.g., enhanced reputation), client values (e.g., solving a business problem) must first be generated. The results further highlight the importance of reciprocal interactions between service providers and their clients in co-creating value for both parties. Service providers' professional knowledge and competence and their clients' levels of professional knowledge and motivation to interact are critical to enable effective interactions. However, the influence of service providers' professional ethics and clients' trust in professionals on project value co-creation is more complex than theoretically predicted. This paper advances the project value creation literature by providing a more holistic view of what value means for different stakeholders, how it is created, and by whom.

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1. Introduction

Projects are increasingly recognized as value creation mechanisms in organizations (Laursen and Svejvig, 2016). Consequently, significant research efforts have been devoted to understanding project value (or benefits) and value creation (Martinsuo et al., 2019). These prior studies can be broadly categorized into three themes. The first theme defines (or redefines) relevant concepts, such as benefits, value, and project success, used in project value-focused research (Chang et al., 2013; Green and Sergeeva, 2019; Zwikael and Smyrk,

2012). The second theme, which is arguably supported by the richest body of literature, investigates value creation processes (Matinheikki et al., 2016; Pargar et al., 2019) and stakeholders' involvement in project lifecycles (Keays and Huemann, 2017; Vuorinen and Martinsuo, 2019; Zwikael and Meredith, 2018). The third theme takes a broader perspective to investigate value creation at program, portfolio, and organizational levels (Martinsuo and Hoverfält, 2018; Riis et al., 2019).

Although these prior studies offer important insights into project value creation, they are limited in two important ways. First, they remain primarily conceptual and qualitative in nature. Such studies, despite offering in-depth insights into the individual aspects of project value creation (e.g., perceived value or the project value creation process), fall short in explaining the associations between these aspects. For example, it is widely accepted that project value is subjectively perceived

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and should be collaboratively created by various stakeholders (Chang et al., 2013; Keeys and Huemann, 2017). However, very little is known about how value is perceived by different stakeholders, whether and to what extent these perceived values are interrelated (e.g., whether one value can enhance or hinder another), the inputs required from various stakeholders to create these values, and what the underlying value creation process is and how it affects various value outcomes. In other words, there remains a lack of a holistic value creation mechanism that explains how initial inputs from project stakeholders lead to various value outcomes through a collaborative value creation process in different project contexts (Keeys and Huemann, 2017; Smyth et al., 2018). Consequently, there are increasing calls in the project value creation literature for more quantitative empirical research that considers the perspectives of various stakeholders (Smyth et al., 2018). Second, in a review of the project value creation literature, Laursen and Svejvig (2016) observed limited references to established theories from other disciplines and encouraged more interdisciplinary empirical research in this field—this view is echoed by many project management scholars, such as Keeys and Huemann (2017) and Smyth et al. (2018).

To address the above limitations, this paper draws upon the well-established service-dominant logic (SDL) theory and literature to holistically examine how project value is perceived and co-created by two key stakeholders, namely professional service providers (henceforth termed “professionals”) and their clients in professional services projects (PSPs). We focus on PSPs because of their critical role in enhancing organizational practices and performance. For example, a specialized consultant may be engaged to address a specific business challenge faced by an organization, such as redesigning a workforce strategic plan. In such projects, the extent to which value is created is a primary concern of organizations (Zwikael and Smyrk, 2012). The strong collaborative relationships between professionals (who often also assume the role of project manager) and their clients in PSPs also provide greater opportunities to investigate project value creation from two different stakeholders' perspectives.

SDL is selected because of its primary focus on service exchanges and its wide application as a meta-framework to theorize value co-creation in various contexts (Vargo and Lusch, 2016, 2017), including the professional service context. Insights from these literature can thus provide a rich theoretical foundation to address our research questions. However, one must be cautious about applying concepts from these prior studies that have predominantly focused on *firms* as the unit of analysis to the project context (Kohtamäki and Rajala, 2016). As noted by Lepak et al. (2007), value creation practices can vary across different levels (e.g., individual and organizational levels) because of the subjective nature of value. Therefore, more context-specific empirical evidence focusing on various levels is warranted to develop a comprehensive understanding of the value creation phenomenon (Vargo and Lusch, 2017). To this end, project management scholars, such as Keegan et al. (2018), have

increasingly recognized a *project* as a distinctive level of analysis due to its unique characteristics.

At its fundamental level, a project is often conceptualized as a temporary organization of resources aimed at achieving specific goals (Turner and Müller, 2003). This means that each project is unique. There will always be some degree of variation in project objectives (e.g., expected value), scope (e.g., deliverables and complexity) and configuration (e.g., project stakeholders). Further, the temporary nature of projects implies that project stakeholders are likely to be working together for the first time and that their relationships will discontinue once the project has been completed. These characteristics may prevent the insights from prior SDL literature that has focused on firm-level business-to-business relationships from being directly applicable to project settings. For example, in the professional service context, a client firm may choose a professional service firm because of its reputation (i.e., trust in the firm). Trust in such cases is an important enabler of value creation for firms (Petri and Jacob, 2016). However, when this business-to-business relationship occurs at the project level, it is likely to involve individuals working together temporarily and for the first time. As such, whether and to what extent trust is critical for value creation at the project level warrants further investigation. In sum, the rich theoretical insights offered by prior SDL literature are subjected to further empirical scrutiny (e.g., empirical confirmation and disconfirmation) to be applied to the project context.

We are not alone in drawing on SDL theory to advance project value creation research. Several project management scholars (e.g., Chang et al., 2013; Fuentes et al., 2019; Smyth et al., 2018) have applied SDL as a theoretical lens to study project value creation; and have called for more research in this area. Extending this line of work, our research offers important theoretical, methodological, and practical contributions to the project value creation literature.

Theoretically, this research develops a more holistic view of value creation mechanism in PSPs by linking the inputs, process, and outcomes of value creation from the perspectives of two important stakeholders—professionals and clients. By drawing on well-established SDL theory to theorize value creation in the PSP context, we also respond to calls for more interdisciplinary research in the project management field (Ahlemann et al., 2013; Keegan et al., 2018). We further demonstrate the importance of reconceptualization and empirical scrutiny in a cross-disciplinary research. Methodologically, we illustrated the use of mix methods (i.e., two studies with qualitative interviews and quantitative survey) and multiple data sets (i.e., four sample sets including a dyadic data set from professionals and their clients) to reconceptualize and validate general theories in the project context (Keeys and Huemann, 2017). In this regard, we add to the limited empirical evidence on value creation that captures both professionals' and clients' perspectives in PSPs (Smyth et al., 2018). This context-specific empirical evidence creates rich opportunities for project value co-creation research and practices in PSPs.

This research also makes a secondary contribution to SDL theory as it adapts SDL's general notions to the specific context

of PSPs. In particular, our research identified the operant resources required by professionals and their clients for value co-creation; and revealed the complex roles of professional ethics and client trust in the creation of value in PSPs. Such empirical evidence can enhance our understanding of the contextual conditions and boundaries of SDL theory in different contexts, further advancing the theory (Vargo and Lusch, 2016, 2017).

In the following sections, we review the literature on project value creation, PSPs, and SDL theory in the professional service context. We then describe the studies conducted to develop a value creation mechanism in PSPs; and conclude with a discussion of our key findings, implications, and future research directions.

2. Theoretical background

2.1. Project value (co-)creation

Significant research efforts have been made to understand what value is and how it is created in projects and organizations (Laursen and Svejvig, 2016). Given the unique characteristics of each project, value in various projects can be defined differently in financial (e.g., project worth and investment return), organizational (e.g., impact on organizations) and social (e.g., influence on the society) terms (Green and Sergeeva, 2019; Martinsuo and Killen, 2014). Despite the lack of a universally agreed definition, the concept of project value comprises three underlying principles. First, project value is multifaceted. Various types of project values, such as financial or technical values, or long-term or short-term values, may be sought across projects or from a single project (Chih and Zwikael, 2015; Martinsuo and Killen, 2014). Second, project value is subjectively perceived by stakeholders. A comprehensive understanding of project value thus must consider different stakeholders' perspectives (i.e., what value is and for whom) and specific contexts (e.g., project types) (Keeyes and Huemann, 2017; Fuentes et al., 2019). Third, given that projects are value creation vehicles for organizations, the creation of project value should be an integral part of project performance evaluation (Chang et al., 2013; Zwikael and Smyrk, 2012).

Several scholars have taken a process perspective to investigate how project value can be created in organizations. Some researchers have proposed that project value can be created through a series of steps, such as identification, prioritization, formulation, and realization (Breese, 2012); while others have focused on improving practices in a specific project value creation step or project phase. For example, Chih and Zwikael (2015) and Zwikael et al. (2018) have developed a conceptual framework and scale to assess the quality of target benefits. Scholars have also identified critical activities that may enhance project value creation in front-end planning (Artto et al., 2016; Matinheikki et al., 2016) and execution phases (Pargar et al., 2019; Vuorinen and Martinsuo, 2019). Keeyes and Huemann (2017) and Vuorinen and Martinsuo (2019) have explored the strategies of different stakeholders in shaping project value creation. Despite their distinct research aims and

differences in stakeholder perspectives, these process-oriented studies consistently identify value creation as a dynamic process involving ongoing interactions among different project stakeholders. Such interactions, which involve information, communication, and relations, can help establish the scope and expectations of the project in advance and increase mutual learnings in the process (Smyth et al., 2018). Together, these may improve project value creation. The emphasis on interactions among project stakeholders has led to the increasing use of the prefix “co-”, as in value co-creation, in the project value creation literature (Chang et al., 2013; Fuentes et al., 2019; Smyth et al., 2018).

By extension, research has also explored value creation in program and portfolio contexts (Martinsuo and Hoverfält, 2018; Martinsuo and Killen, 2014) and in organizational contexts (Riis et al., 2019; Wikström et al., 2010).

2.2. Characteristics of professional service projects (PSPs)

PSPs involve the application of professionals' specialized knowledge and skills to specific processes (e.g., problem identification and resolution) for the benefit of their clients (Lewis and Brown, 2012). This highlights the importance of value creation for clients in PSPs, which can, in turn, affect the performance of professionals and their organizations (e.g., leading to new business opportunities). It further reveals the three “operational building blocks” of PSPs—professionals, clients, and the interactions between them (henceforth termed “professional–client interactions”)—that must be considered in understanding value creation mechanisms in PSPs.

In PSPs, professionals, who often also assume the role of project managers, must work collaboratively with clients to define the problem and to produce and deliver service packages that address the problem (Kellogg and Nie, 1995). This means that project value and its associated service packages may not be specifically defined in advance. Rather, they will be shaped by the inputs from professionals (e.g., their knowledge and abilities to address clients' needs) and clients (e.g., their context information and abilities to articulate their needs). However, PSPs' knowledge intensity and asymmetry nature, and service intangibility can make it difficult for both parties to co-create value. It is challenging for professionals to explain technical knowledge and its associated value propositions, that is, the value that clients can expect. Conversely, clients, as non-experts, may find it difficult to understand and evaluate the professional services received, a phenomenon von Nordenflycht (2010) terms “opaque quality” (p. 61). As a result, clients tend to assess service quality based on what they can observe, such as the behaviors of the professionals they interact with.

Value creation in PSPs also involves extensive interactions between professionals and clients, including reciprocal collaboration and formal and informal communications. Through these interactions, professionals and clients combine their inputs to jointly develop the scope and content of a service package (Kellogg and Nie, 1995). These interactions also provide clients the opportunities to observe and evaluate

professionals' behaviors, which are a proxy of service quality (von Nordenflycht, 2010). The relationships that clients establish with professionals during these interactions will also affect their perception of overall service quality (Eisingerich and Bell, 2008). Given the individual judgments involved in PSPs, such professional–client interaction practices can be highly customized.

2.3. Service dominant logic (SDL) in professional service context

SDL is a general meta-theoretical framework that has been applied to investigate how firms, customers, and other market actors co-create value in many disciplines (Vargo and Lusch, 2016, 2017). Given that value creation is context-specific (Lepak et al., 2007), this section reviews the prior SDL literature that has focused on professional services.

The basic precept of SDL is that service—the applications of resources for the benefit of others (Vargo and Lusch, 2017, p. 48)—is the fundamental basis of exchange. It suggests that all social and economic actors, including customers, are co-creators and interpreters of value. Value is co-created when the operant resources (e.g., knowledge, capability and competence) of these actors are integrated. To this end, researchers have identified some operant resources required of service providers and clients to enable value co-creation in the professional service context. Examples of such include clients' information about their needs and business/industry contexts; and service providers' specialized knowledge, technical and diagnosis skills (Aarikka-Stenroos and Jaakkola, 2012; Petri and Jacob, 2016).

Given its subjective nature, value is phenomenologically and contextually determined by individual actors, including customers (Ranjan and Read, 2016). For customers, value emerges when they utilize firms' offerings (e.g., products and services). Such value is often conceptualized as “value-in-use” (Grönroos and Voima, 2013) - “a customer's outcome, purpose or objective that is achieved through service” (Macdonald et al., 2011, p. 671). Clients use professional services for various reasons, such as expanding their workforce, obtaining new market insights and expertise to address business challenges, or legitimizing decision-making (Petri and Jacob, 2016). Grönroos and Voima (2013) argue that the creation of customers' value-in-use is a primary focus of value co-creation. However, given the reciprocal nature of service exchange, other actors in the service provision also drive value (Vargo and Lusch, 2016). For example, professional service firms will also derive value (e.g., increased revenue and enhanced competitive advantages) from their service offerings. Compared with the rich conceptualization of customers' value-in-use in the literature, value consideration from the perspective of firms and other actors has been less theoretically developed. In accordance with the definition of value-in-use, we conceptualize the value created for professional service firms as “value-for-firm”, that is, the firm's purpose, objectives, and outcomes achieved from their service offerings. This distinction between the customer's value-in-use and the firm's value-for-firm is important because

it enables us to understand what value is and how value is created from the perspectives of customers and firms, respectively (Grönroos and Helle, 2010), and to empirically examine the possible associations between them.

Prior literature further highlights the central role of interactions in value co-creation. In this process, customers actively participate in co-producing the services offered by firms and create their value by using these services. The importance of direct client participation and the collaborative professional–client interactions in creating clients' value-in-use has been confirmed in the context of professional financial services and knowledge-intensive services (Aarikka-Stenroos and Jaakkola, 2012). Simultaneously, firms make value propositions and support customers' value creation. This close interaction between firms and customers makes the value co-creation process inherently customer and relationship oriented. In a service ecosystem, interactions can be expanded to include other actors (Vargo and Lusch, 2017).

2.4. Theoretical points of departure

This research aims to develop a holistic view of the value co-creation mechanism in PSPs by linking the inputs, process, and outcomes of value creation. Given the lack of a universally agreed definition for value co-creation, we build on the notion that value co-creation is “a function of interaction” (Grönroos and Voima, 2013, p. 133) and the outcome of resource integration (Vargo and Lusch, 2016, 2017) to define value co-creation as: an interactive process of resource integration involving a broad set of actors for the benefit of all. We aim to answer the following questions: (1) How is value perceived by professionals and clients in PSPs (i.e., the outcomes)? (2) What is the role of professional–client interactions in creating such value (i.e., the process)? and (3) What are the required professional- and client-related operant resources for value co-creation (i.e., the inputs)? This investigation logic aligns with the input–process–outcome (IPO) model, an analytical model widely used to understand the influence of independent variables (inputs) on dependent variables (outcomes) through the intermediate processes that transform inputs into outcomes. Thus, we used the IPO model as an analytic lens to integrate key findings from previously reviewed literatures (see Table 1).

Table 1 shows that the existing project value creation literature offers insights into value outcomes and value co-creation processes but is largely silent on the required operant resources from stakeholders for value co-creation. For our research focuses, we can draw on the comprehensive insights offered by prior SDL literature; however, it has two important limitations. First, these prior works focus on value from either the clients', or firms' perspective: a majority of which has examined clients' value. Empirical investigations that capture multiple actors, such as professionals' and their clients' perspectives, in the professional service context remains scarce (Ekman et al., 2016). Given that value co-creation involves multiple actors, this *one-sided* consideration of value is theoretically incomplete (Vargo and Lusch, 2017). To overcome this limitation and understand value creation from both

Table 1
IPO-based analytic overview of key findings from prior literature.

	Input	Process	Outcome
Related-research question	What are the required professional- and client-related operant resources for value co-creation?	What is the role of professional–client interactions in creating value?	How is value perceived by professionals and their clients in PSPs?
Key SDL principles	Operant resources (i.e., knowledge, competence, and capability) are the foundations upon which value is co-created (Vargo and Lusch, 2016, 2017).	Interactions are at the core of value co-creation (Grönroos and Voima, 2013; Vargo and Lusch, 2016, 2017).	Value is phenomenologically and contextually determined by individual actors, including customers, based on their needs and resource bases (Grönroos and Voima, 2013; Ranjan and Read, 2016; Vargo and Lusch, 2016, 2017).
SDL literature in PSP contexts	Professionals' specialized knowledge and technical and diagnosis skills (Aarikka-Stenroos and Jaakkola, 2012; Petri and Jacob, 2016). Clients' knowledge and insights about needs, objectives, business, and industry (Aarikka-Stenroos and Jaakkola, 2012; Petri and Jacob, 2016).	Clients' direct participation and collaborative professional–client interactions are critical in creating client's value-in-use (Aarikka-Stenroos and Jaakkola, 2012).	Clients' value-in-use may include enlarging their workforce, obtaining new market insights and legitimize their decision-making (Petri and Jacob, 2016). Professional service firms' value-for-firm may include to increase revenue and enhance competitive advantages (Aarikka-Stenroos and Jaakkola, 2012).
Project value creation literature	Not available.	Project value creation process is a dynamic process involving ongoing collaborative interactions between project stakeholders (Artto et al., 2016; Chih and Zwikael, 2015; Keeys and Huemann, 2017; Matinheikki et al., 2016; Pargar et al., 2019; Vuorinen and Martinsuo, 2019; Zwikael et al., 2018).	Project value is multifaceted (Chih and Zwikael, 2015; Green and Sergeeva, 2019; Martinsuo and Killen, 2014); and subjectively perceived by stakeholders (Fuentes et al., 2019; Keeys and Huemann, 2017).

perspectives, there is a need to distinguish between the customer's value (i.e., value-in-use) and the firm's value (i.e., value-for-firm) (Grönroos and Helle, 2010). Second, most of the prior SDL studies focusing on professional services were conducted at the firm level. Given the unique and temporary characteristics of projects, whether and to what extent findings from these prior studies are applicable to PSPs warrants further theoretical and empirical investigation. For these reasons, this research was conceived as both exploratory and confirmatory; consequently, we used a mixed methods design, integrating qualitative (Study 1) and quantitative (Study 2) approaches.

3. Research methodology and results

3.1. Research overview

We conducted two studies to theorize value co-creation in PSPs through the lens of SDL theory. In Study 1, we conducted interviews with two samples (referred to as Studies 1a and 1b) to customize generic SDL concepts and identify emerging context-specific factors to develop empirically testable hypotheses in PSPs. This re-contextualization of a general theory from other disciplines to the project context, integrating practitioners' inputs, is essential to capture both theoretical and practical insights in theory advancement (Keegan et al., 2018; Vargo and Lusch, 2017). In Study 2, we collected survey data from two independent samples (referred to as Studies 2a and 2b) to empirically test our theoretical predictions derived from Study 1 and the literature and to ensure the generalizability of our research findings. The survey items used in Study 2 are presented in the appendix. The unit of analysis in all studies is “a PSP.”

3.2. Study 1: qualitative interviews

3.2.1. Samples and types of PSPs

In Study 1a, we used a purposive sampling approach (Kerlinger, 1986) to collect data from nine participants (i.e., seven male and two female professionals) with an average of 14.5 years' experience involved in diverse PSPs in Australia. The diversity of PSPs enabled us to identify emergent patterns in practices. In Study 1b, building on Study 1a, using a purposive convenience sampling approach, we further interviewed four professionals (i.e., two males and two females with an average of 10.7 years' industry experience) and their clients in the same architectural service projects in Taiwan to solicit inputs from both perspectives. One professional referred us to two clients, resulting in five professional–client dyadic interviews. All professionals interviewed in both studies were those who led and manage the PSPs. Client participants in Study 2b were those who directly interacted with the professionals (see Table 2).

3.2.2. Data collection and analysis

In Studies 1a and 1b, data were collected through semi-structured interviews. SDL notions were used to guide the formulation of interview questions and data analysis. Example questions for professionals included, “What were the objectives your firm aimed to achieve from this project?” and “How did you interact with the client?”. To ensure a clear focus on the project level, we asked professionals to keep in mind a recent successfully completed PSP when answering questions. In Study 1b, additional interviews were arranged directly with project clients. Each interview lasted approximately 1 h.

Table 2
Brief project descriptions and interviewees (Study 1).

ID	Project description	Interviewee	
		P	C
Study 1a: Diverse PSPs in Australia			
A	Review the efficiency of two public agencies with similar roles	✓	
B	Review a government employment scheme	✓	
C	Provide project management service to a public agency	✓	
D	Develop a 20-year implementation plan for prime minister's decision-making	✓	
E	Review the engineering and maintenance procedures in the clients' organizations	✓	
F	Design new training, water protection, and supporting facilities	✓	
G	Establish a platform to facilitate community-wide knowledge sharing	✓	
H	Enhance organizational capability through process improvement and IT systems	✓	
I	Assess the client's workforce problems and develop a strategic workforce plan	✓	
Study 1b: Architectural service projects in Taiwan			
J	Preserve and renovate an old private house	✓	✓
K	Design and build a new residential house	✓	✓
L	Interior design for a newly built 3-bedroom apartment	✓	✓
M	Design and build a new residential house	✓	✓
N	Design and build a new residential house	✓	✓

Notes: P: Professional; C: Client.

Interview protocols were used to ensure information reliability and all interviews were recorded for data analysis.

In both Studies 1a and 1b, interview data were analyzed following an iterative process (Miles and Huberman, 1994). We first analyzed the data to identify emergent constructs corresponding to our research questions and relevant SDL concepts. For example, based on the SDL literature, we analytically distinguished value-for-firm from value-in-use. When reviewing the interview data, we clustered responses about firms' objectives into the value-for-firm construct and responses about clients' objectives into the value-in-use construct. In Study 1b, we further contrasted the responses from professionals and clients. We then synthesized the findings to develop the research framework and empirically testable hypotheses.

3.2.3. Research findings and hypotheses conceptualization

Our findings from Studies 1a and 1b are depicted in Fig. 1 in the form of an emergent value co-creation mechanism in PSPs. This is followed by a detailed discussion.

3.2.3.1. Operant resource inputs to professional-client interaction. Our findings revealed two sets of professional- and client-related operant resources that need to be integrated through professional–client interactions to co-create value in PSPs.

3.2.3.2. Professional-related operant resources. Given the high level of knowledge intensity and asymmetry in PSPs, clients often depend on professionals to lead the interactive process. In accordance with findings from prior research (Aarikka-Stenroos and Jaakkola, 2012; Petri and Jacob, 2016), our findings suggest that professional knowledge and competence, such as a client-centered attitude and effective communication skills, is a critical operant resource to facilitate effective professional–client interactions. This variable, often reflected in a professional's reputation, was summed up by a Professional (Project B): “They went to us, they said, “you were recommended as the best people to do this.” So, we had a good reputation because we had done, as I said, three other

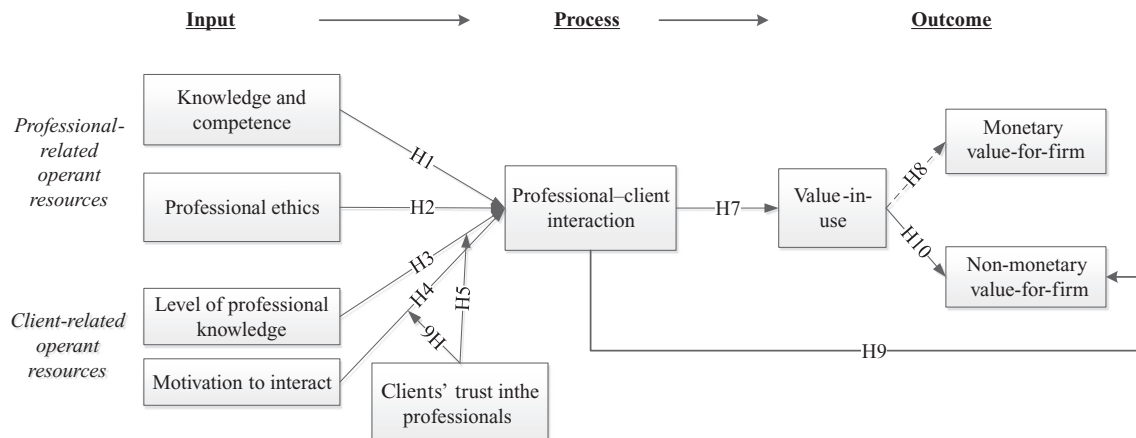


Fig. 1. Proposed value co-creation mechanism in PSPs.

significant consultancies [similar projects] for the department. I was able to bring my knowledge of other jobs we've done to this one."

In line with Karpen et al. (2012), our findings also confirm the importance of professionals' professional ethics in PSPs. This importance stems from the heavy reliance of clients on professionals' assistance in clarifying their needs and striking a balance between resource constraints and expectations. Professionals who compromise their ethics to please clients can negatively affect the professional–client interaction and, consequently, project value creation outcomes. This is reflected in one client's (Project J) disappointing experience with her former "all-agreeable" architect. Based on these findings and literature, we thus proposed that:

H1. Professional knowledge and competence is positively related to professional–client interactions.

H2. Professional ethics is positively related to professional–client interactions.

3.2.3.3. Client-related operant resources and the emergent moderator of trust. In PSPs, clients work collaboratively with professionals to define project scope and co-produce service packages. Therefore, clients' level of professional knowledge and their motivation to interact with professionals are critical for effective professional–client interactions. Clients with good professional knowledge will be more capable of participating in a meaningful dialogue with professionals and more understanding of the uncertainty associated with project delivery processes. This was noted by a professional from an architectural service project (Project N): "*The current client [with a civil engineering bachelor's degree] is familiar with the architectural construction processes and aware of the uncertainty involved. So, he is more understanding when issues arise, and we need to make on-site adjustments.*" This finding is important because much of the prior SDL and project value creation literature has focused on the importance of customers' knowledge about their needs and their business/market contexts in value co-creation (Aarikka-Stenroos and Jaakkola, 2012; Petri and Jacob, 2016). However, our finding revealed another important dimension of clients' knowledge—their professional knowledge—in value co-creation in a PSP because of its unique knowledge-intensive nature. This finding thus contributes to the limited theoretical base (Eisingerich and Bell, 2008; Mikolon et al., 2015) about the role of clients' professional knowledge in value co-creation in PSPs.

In line with Petri and Jacob (2016), professional–client interactions will also be more effective when clients are highly motivated to interact with professionals. This was well-illustrated by all clients in Study 1b, who were highly motivated to interact with the professionals because of their personal involvement in projects, such as building or renovating their homes. This strong motivation positively influenced their interactions with professionals. Thus, we proposed that:

H3. Client's level of professional knowledge is positively related to professional–client interactions.

H4. Client's motivation to interact is positively related to professional–client interactions.

Interestingly, all professionals in Study 1b emphasized that their clients' strong trust in them was the key to their effective interactions. Thus, we argued that clients' trust in professionals can strengthen the positive association of the client's professional knowledge and motivation to interact with the professional–client interaction. This was exemplified by the client of Project N in Study 1b, who was highly motivated to interact with the professionals because the project involved his first house, he had a sufficient level of professional knowledge derived from his training in civil engineering, and he demonstrated a strong trust toward the professional. As such, the client was more open-minded regarding the professional's recommendations and was highly engaged in meaningful communications, resulting in a productive professional–client interaction as perceived by both parties. Indeed, trust is found to be critical in collaborative professional–client relationships (Eisingerich and Bell, 2008; Karpen et al., 2012), and the development of a trusting relationship prior to and throughout a project is essential to project value co-creation (Matinheikki et al., 2016). Thus, we proposed that:

H5. Client's trust in the professional moderates the relationship between the client's level of professional knowledge and the professional–client interaction, such that a higher level of trust will strengthen the positive relationship between the client's level of professional knowledge and the professional–client interaction.

H6. Client's trust in the professional moderates the relationship between the client's motivation to interact and the professional–client interaction, such that a higher level of trust will strengthen the positive relationship between client's level of motivation to interact and the professional–client interaction.

3.2.3.4. Value co-creation process in PSPs. Our findings further illustrate the various effects of professional–client interactions on the creation of diverse values in PSPs.

3.2.3.5. Values in PSPs. The delivery of clients' value-in-use is the core of PSPs (Zwikael and Smyrk, 2012). Supporting the multifaceted nature of project value (Chih and Zwikael, 2015; Martinsuo and Killen, 2014), our results show that clients used PSPs for a variety of reasons, including to supplement their professional knowledge and make unbiased decisions. Clients' assessments of value-in-use are often based on how well these objectives are met. However, we found that in cases where clients' objectives had not been fully met, clients still assessed their value-in-use favorably because of their positive perception of service quality (e.g., believing that professionals had considered various alternatives before discontinuing) and (2) their good working relationships with the professionals (e.g., believing that their inputs had been integrated into professional services). This finding confirms the view that clients' assessment of value-in-use is multidimensional (Macdonald et al., 2011; Williams et al., 2015).

In our research, value-for-firm refers to the objectives that the professionals aim to achieve for their firms through PSPs. Our findings revealed two types of value-for-firm: monetary and non-monetary. Even though monetary value was viewed as fundamental in all cases, diverse non-monetary values (e.g., strengthening reputation and broadening connections) was also emphasized by professionals because of their firms' strong reliance on client recommendations for business success (Aarikka-Stenroos and Jaakkola, 2012). These various types of value-for-firm were illustrated by a professional: “*We hoped to get money. Also, well, one, it's a great case study. Two, it builds reputation. Three, I was able to bring in one of the junior consultants with me so I could build her knowledge and experience on a really good project. It was also an opportunity to demonstrate to other clients that we could do a good job*” (Project D).

3.2.3.6. Effect of professional–client interaction on values in professional services projects. Supporting Smyth et al.'s (2018) notion that “co-creation occurs through interactions” (p. 171), our findings confirm the central role of effective professional–client interactions in value co-creation in PSPs. This was noted by a professional (Project G) who stated, “*It's not just me doing something; it's literally, I can't work unless they [the clients] work with me.*” Our findings revealed that professional–client interactions positively affected clients' value-in-use in three possible ways. First, these interactions allowed clients to collaborate with professionals to define project objectives and requirements and to co-produce customized service offerings to potentially maximize their value-in-use (Karpen et al., 2012; Smyth et al., 2018). The relationships between clients and professionals established through these interactions could also facilitate mutual learning and knowledge sharing, leading to enhanced project value (Williams et al., 2015). Second, these interactions allowed new potential value-in-use to emerge (Smyth et al., 2018). As described by one professional (Project F): “*They [clients] might not have known what they actually wanted—they wanted to be presented with possibilities that they hadn't thought of.*” Third, these interactions allowed clients to observe professionals' behaviors to assess service quality, which would otherwise be difficult for clients in knowledge-intensive PSPs (von Nordenflycht, 2010). Thus, we proposed that:

H7. Professional–client interaction is positively related to clients' value-in-use.

Our findings also show that clients' value-in-use is a prerequisite for value-for-firm, but that the level of dependency varies across different types of value-for-firm. The professional–client interaction is found to positively influence value-for-firm in two ways. First, it may directly enhance value-for-firm, such as creating new capabilities that may be applied to other projects and enhancing operational efficiency through lessons learned (Kujala et al., 2010). For example, a professional (Project K) developed a new architectural design approach that was later used in his other projects to improve productivity. Second, it may indirectly enhance value-for-firm

through improved value-in-use, such as new business opportunities arising from client recommendations. However, we found that these positive effects varied between monetary and non-monetary value-for-firm. Monetary value-for-firm, such as financial payment, is created when PSPs are completed according to contracts and is less reliant on clients' value-in-use. In contrast, non-monetary value-for-firm, such as strengthened reputation, relies heavily on clients' value-in-use. One professional explained: “*If value [-in-use] has been realized for a first-time client, there's a possibility that there'll be a positive outcome for the company to be seen in a good light. If value has been realized for a repeat client, there's a possibility they'll become a champion, which means they will put us at least in a more competitive environment for repeat work*” (Professional, Project D). These findings reveal the potential complex linkages between various value outcomes in PSPs. Consequently, we proposed that:

H8. The relationship between value-in-use and non-monetary value-for-firm is stronger than the relationship between value-in-use and monetary value-for-firm.

H9. Professional–client interaction is positively related to non-monetary value-for-firm.

H10. Professional–client interaction is indirectly related to non-monetary value-for-firm via value-in-use.

3.3. Study 2: Quantitative survey

We conducted two studies to test the proposed hypotheses derived from Study 1. Study 2a was designed to examine the relationships between the professional- and client-related operant resources and the professional–client interaction (i.e., H1 to H6). This study consisted of 74 matched professional–client dyads in architectural service projects in Taiwan. Study 2b extended Study 2a to test the full set of hypotheses (i.e., H1 to H10), including the effects of professional–client interactions on various value outcomes. This study consisted of 200 professionals from diverse PSPs in the US.

3.3.1. Samples and procedures

3.3.1.1. Study 2a. Data were collected from professionals and their clients involved in the same architectural service projects in Taiwan. Specifically, a survey kit containing the professional questionnaire was sent to 445 architects identified through professional association websites in Taiwan. The professionals were requested to consider a completed architectural service project they had been involved in when answering questions. They were also asked to provide their project clients' email contacts or to forward questionnaires to them. The same questions, phrased differently to reflect the client's perspective, were used in the client questionnaire. Clients were asked to send the completed surveys directly to the research team. The two sets of questionnaires were matched using a project identification number. We received 83 surveys from professionals and 74 surveys from clients, resulting in 74 matched

professional–client surveys. The professional sample consisted of 66.2% male. The majority of participants were aged 30–50 years (90.5%) and had a master's degree (78.4%). Average duration of professional experience was 14.86 years. In the client sample, 70.27% were male. The majority (71.8%) of client participants were aged 30–50 years and 93.2% of them had a bachelor's degree or above.

3.3.1.2. Study 2b. Data were collected from professionals in the US through an online survey administered by Qualtrics. A total of 4575 invitations were sent to potential participants, with 863 participants (19%) attempting to complete the survey. Of these, 548 were excluded because of lack of relevant PSP experience and 115 were excluded because they failed the built-in attention tests and completion time threshold of 8.5 min. After exclusion, 200 valid questionnaires remained. The final sample consisted of 58% female participants. Participants worked in diverse PSPs, including information technology (28%), finance and accounting (17%), management consulting (15%), medical consulting (13%), marketing (11%), architecture and engineering (8%), and legal services (6%). The average duration of professional experience was 15 years. The majority (77%) of them were aged 30–60 years and 73% had an academic degree.

3.3.2. Measures

Established measures in literature were adapted and rephrased to suit the PSP context. All items used a seven-point Likert scale anchored from 1 (strongly disagree) to 7 (strongly agree).

3.3.2.1. Professional knowledge and competence (PKC). In Study 2a, PKC was measured using a 10-item scale from Sharma and Patterson (1999) and Parasuraman et al. (1994). An example item in the professional's questionnaire was "I possess the specialized knowledge required to successfully deliver the services". In Study 2b, which aimed to test H1 to H10, we measured PKC using a shortened 5-item scale to reduce the length of the survey and increase response rate. To examine whether the shortened measure of PKC was equivalent to the full 10-item measure, we administered both scales to an independent sample of 200 PSP clients in the US. This independent sample was also used to assess the content adequacy of two other shortened scales used in Study 2b. Bivariate correlations showed that the short and long versions were highly correlated ($r = .98$, $p < .001$), suggesting the equivalence of the shortened and the full scales. The reliability coefficient for PKC in Studies 2a and 2b were .87 and .97, respectively.

3.3.2.2. Professional ethics (PE). In both Studies 2a and 2b, PE was measured using two items adapted from Akaah and Lund (1994). An example item in the professional's questionnaire was "I would not conceal an error I made". The scale's alpha coefficients for Studies 2a and 2b were .61 and .71, respectively.

3.3.2.3. Client level of professional knowledge (CPK). CPK was measured using two items adapted from Eisingerich and Bell (2008). In Study 2a, clients reported their own CPK. An example item was "I understood all aspects of the services that the professional provided". In Study 2b, professionals rated CPK based on their perceptions of their clients' professional knowledge. The scale's alpha coefficients for Studies 2a and 2b were .66 and .90, respectively.

3.3.2.4. Client motivation to interact (CM). CM was measured in Study 2a using a two-item scale adapted from Guay et al. (2000). An example item was "I was motivated to participate in the entire process". Cronbach's alpha was .90. In Study 2b, professionals reported their perceptions of their clients' motivation using a single item. Using the same above-mentioned independent client sample, the short and full scales were found to be highly correlated ($r = .93$, $p < .001$).

3.3.2.5. Client trust in the professional (CT). CT was measured using two items adapted from Moorman et al. (1992). In Study 2a, clients reported their levels of trust toward professionals. An example item was "If I was unable to monitor the professional's activities, I would be willing to trust his/her to get the job done right". Study 2b used the same measure for professionals to report their perception of client trust toward them. Cronbach's alphas for Studies 2a and 2b were .71 and .76, respectively.

3.3.2.6. Professional–client interaction (PCI). In Study 2a, PCI was measured using a 7-item scale adapted from Moorman et al. (1992) and Yi and Gong (2013). An example item for the professional was "Disagreements between the client and me tended to be handled productively". We combined both professionals' and clients' ratings as an index of PCI. The reliability coefficient was .77. In Study 2b, professionals rated PCI with a shortened 4-item measure. Based on the same independent client sample, this shortened measure of PCI was found to be equivalent to the full measure ($r = .95$, $p < .001$). Cronbach's alpha for Study 2b was .84.

The following measures were used only in Study 2b to investigate the relationship between professional–client interactions and value outcomes.

3.3.2.7. Value-in-use (VIU). In Study 2b, professionals reported their perception of clients' VIU using a three-item scale adapted from Sweeney and Soutar (2001). An example item was "The services I provided offered good value for money". Cronbach's alpha was .96.

3.3.2.8. Non-monetary value-for-firm (NMVF). In Study 2b, professionals rated NMVF based on two items adapted from Yi and Gong (2013). An example item was "I believe the client will say positive things about me to other potential clients shall the opportunity arise." Cronbach's alpha was .91.

3.3.2.9. Monetary value-for-firm (MVF). In Study 2b, professionals rated monetary value-for-firm (MVF) based on two

Table 3
Descriptive statistics and zero-order correlations of the study variables in Study 2a.

Variable	Mean	SD	1	2	3	4	5	6
1. Professional-reported PKC	6.32	.54	(.87)					
2. Professional-reported PE	6.49	.61	.48 ***	(.61)				
3. Client-reported CPK	5.74	.99	.07	.15	(.66)			
4. Client-reported CM	6.27	.84	.09	.08	.37 **	(.90)		
5. Client-reported CT	6.32	.86	.15	.20+	.32 **	.21+	(.71)	
6. Combined ratings of PCI	6.23	.52	.36 **	.37 ***	.56 ***	.41 ***	.41 ***	(.77)

N = 74; +p < .10

** p < .01,

*** p < .001

items adapted from Lapierre (1997). An example item was “We made reasonable profit for the services I provided.” Cronbach's alpha was .79.

3.3.3. Data analysis and results

3.3.3.1. Study 2a. We tested H1 to H6. The descriptive statistics and zero-order correlations were presented in Table 3. Correlations among the study variables were in the expected direction. We conducted a hierarchical multiple regression analysis to assess the incremental explanatory power of variables in each block (Cohen and Cohen, 1983). We clustered professional-related and client-related constructs into separate blocks in the regression model to assess its relative contribution in predicting professional-client interaction. Following Aiken et al. (1991), we entered the professional-related factors (professional-reported PKC and PE) in the first block of the regression equation to assess the main effects of professional-related factors on PCI. In the second step, we entered the client-related factors (client-reported CPK, CM and CT) to test for the main effects of client-reported variables on PCI. This approach allowed us to assess the relative contribution of each set of factors in predicting PCI. The multiplicative interaction terms

were computed between the client-related factors (CPK and CM) and the moderator variable (CT) and entered in the regression equation in Step 3. In order to reduce multicollinearity, all the study variables were mean-centered (Aiken et al., 1991).

Table 4 shows the results for the regression analysis with PCI as the dependent variable. The professional-related factors significantly predicted PCI, $\Delta R^2 = .18$, $F(2,71) = 7.87$, $p < .001$. Specifically, there was a positive association between PE and PCI ($\beta = .26$, $p < .05$) while the relationship between professional-reported PKC and PCI ($\beta = .24$, $p = .058$) was approaching significance. Thus, H1 was marginally supported; and H2 was supported. Client-related factors significantly predicted PCI over and above the contribution of the professional-related factors $\Delta R^2 = .33$, $F(3,68) = 15.51$, $p < .001$. Both client-reported CPK ($\beta = .19$, $p < .05$) and CM ($\beta = .41$, $p < .01$) were positively associated with PCI. H3 and H4 were supported.

Entry of the two interaction terms (client-reported CPK \times client-reported CT and client-reported CM \times client-reported CT) in Step 3 explained an additional amount of variance in predicting PCI, $\Delta R^2 = .05$, $F(2,66) = 3.71$, $p < .05$. The interaction representing client-reported CPK \times client-reported

Table 4
Hierarchical moderated regression predicting professional-client interaction in Study 2a.

Study variables	Combined ratings of professional-client interaction		
	Step 1	Step 2	Step 3
Professionals' characteristics			
Professional-reported PKC	.24 ⁺	.20*	.21*
Professional-reported PE	.26*	.18 ⁺	.17 ⁺
Client's characteristics			
Client-reported CPK		.19*	.23*
Client-reported CM		.41 ***	.38 ***
Client-reported CT		.17 ⁺	.12
Two-way interactions			
Client-reported CT \times Client-reported CPK			-.28*
Client-reported CT \times CM			.07
R^2	.18 ***	.51 ***	.56*
ΔR^2	.18 **	.33 ***	.05*
F	7.87 **	15.51 ***	3.71*

⁺ p < .10,

* p < .05;

** p < .01;

*** p < .001

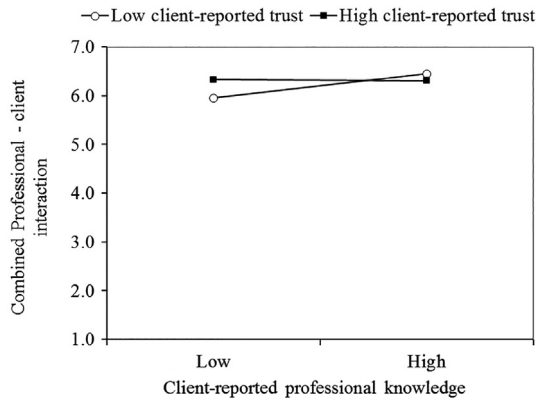


Fig. 2. Interactive relationship between client-reported professional knowledge and competence and combined professional-client interaction at high and low levels of client's trust in Study 2a.

CT interaction term was significant ($\beta = -.28, p < .05$). However, there was no significant interaction between CM and CT on PCI ($\beta = .07, ns$). We plotted the simple slopes involving the relationship between client-reported CPK and PCI at high and low levels of client-reported CT. As indicated in Fig. 2, there was a positive relationship between client-reported CPK and PCI at low client-reported CT, $b = .25, p < .01, t(65) = 2.89, p < .01$, but not at high client-reported CT, $b = .01, t(65) = -.14, ns$. H5 was partially supported, while H6 was not supported.

3.3.3.2. Study 2b. We tested the full research model (H1 to H10). Descriptive statistics, inter-correlations, and internal consistency reliabilities of the study variables are presented in Table 5. We found significant correlations between professional- and client-related factors and PCI. All factors were in the expected direction. As in Study 2a, we used the same data analytic procedures to test for main and interactive effects.

Table 6 shows the results for the regression analysis with PCI as the dependent variable. The professional-related factors significantly predicted PCI, $\Delta R^2 = .21, F(2,197) = 26.33, p < .001$. PKC was positively associated with PCI ($\beta = .45, p < .001$). However, PE did not exert any significant effects on PCI ($\beta = .02, p = .81$). H1 was supported, whereas H2 was not supported. Client-related factors significantly predicted PCI

Table 6
Hierarchical moderated regression predicting professional-client interaction in Study 2b.

Study variables	Combined ratings of professional-client interaction		
	Step 1	Step 2	Step 3
Professionals' characteristics			
PKC	.45 ***	.00	-.02
PE	.02	-.06	-.05
Clients' characteristics			
CPK		.43 ***	.44 ***
CM		.16 *	.14 *
CT		.29 ***	.27 ***
Two-way interactions			
CT × CPK			.23
CT × CM			-.29 *
R^2	.21 ***	.59 ***	.60 ⁺
ΔR^2	.21 ***	.37 ***	.01 ⁺
F	26.33 ***	58.40 ***	2.54 ***

* $p < .05$.
*** $p < .001$.
⁺ $p < .10$.

over and above the contribution of the professional-related factors $\Delta R^2 = .37, F(3,194) = 58.40, p < .001$. Both CPK ($\beta = .43, p < .001$) and CM ($\beta = .16, p < .05$) were positively associated with PCI. H3 and H4 were supported.

Inclusion of the two interaction terms (CPK × CT and CM × CT) in Step 3 explained a marginal amount of variance in PCI, $\Delta R^2 = .01, F(2,192) = 2.54, p = .082$, thus falling into the typical range (i.e., $.01 \leq R^2 \leq .03$) reported for moderator effects in non-experimental studies (Champoux and Peters, 1987). The interaction involving CPK × CT interaction term was non-significant ($\beta = .23, ns$). There was a significant interaction between CM and CT on PCI ($\beta = -.29, p < .05$). Information from the regression equations was extracted to plot the relationship between client-related factors on PCI at low and high levels of CT. Fig. 3 shows the relationship between CM and PCI at high and low levels of CT. At high levels of CT, the positive relationship between CM and PCI was non-significant, $b = .00, t(192) = .04$. However, at low levels of CT, the positive association between CM and PCI was significant, $b = .24, t(192) = 2.90, p < .001$. Overall, H5 was not supported, while H6 was partially supported.

Table 5
Descriptive statistics and zero-order correlations of the study variables in Study 2b.

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. PKC	6.04	1.40	(.97)									
2. PE	5.98	1.55	.61 ***	(.71)								
3. CPK	6.05	1.19	.56 ***	.40 ***	(.90)							
4. CM	6.14	1.22	.47 ***	.32 ***	.73 ***							
5. CT	6.14	1.23	.61 ***	.44 ***	.61 ***	.69 ***	(0.76)					
6. PCI	5.91	1.09	.46 ***	.29 ***	.63 ***	.72 ***	.66 ***	(0.84)				
7. VIU	6.44	1.08	.57 ***	.40 ***	.56 ***	.71 ***	.70 ***	.65 ***	(0.96)			
8. MVF	6.01	1.08	.36 ***	.19 **	.51 ***	.58 ***	.47 ***	.58 ***	.56 ***	(0.79)		
9. NMVF	6.28	1.06	.54 ***	.35 ***	.59 ***	.74 ***	.72 ***	.72 ***	.87 ***	.54 **	(0.91)	

N = 200.
** $p < .01$.
*** $p < .001$.

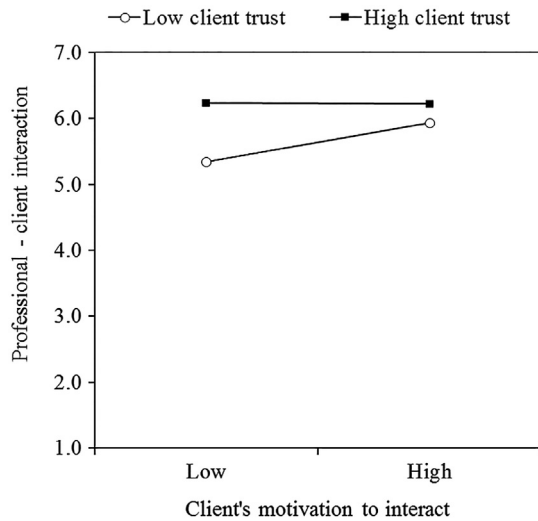


Fig. 3. Interactive relationship between client's motivation to interact and professional-client interaction at high and low levels of client's trust in Study 2b.

We used Model 4 of the PROCESS macro developed by Hayes (2012) to assess the indirect effects. After controlling for professional- and client-related factors, we examined the indirect relationship between PCI and NMVF (H10) via VIU. Using 5000 bootstrap re-samples, the indirect effects linking PCI and NMVF ($b = .38$, 95% CI: .23 to .57) via VIU were statistically significant. Given that the range is positive and the lower bound does not include 0, H10 was supported. Similarly, we found a significant direct effect and positive association between PCI and the following variables: VIU ($b = .64$, 95% CI: .53 to .74) and NMVF ($b = .18$, 95% CI: .09 to .27). H7 and H9 were supported.

Finally, H8 was tested using a procedure for assessing the difference between the strength of dependent correlations. Specifically, a Steiger (1980)'s test examined whether the strength of the positive relationship between VIU and NMVF was statistically stronger than the strength of the relationship between VIU and MVF. Results of the Steiger's test suggest that the strength of the relationship between VIU and NMVF was stronger than the relationship involving VIU and MVF, $t(197) = 9.43$, $z = 8.14$, $p < .001$. Overall, H8 was supported.

4. Discussion and implications

In this paper, we respond to the calls for more multidisciplinary empirical research to consider specific contexts, such as project types, and multiple stakeholders' perspectives in project value creation research (Keays and Huemann, 2017; Smyth et al., 2018). We drew from well-established SDL theory to develop insights on how values are perceived and co-created by professionals and clients in PSPs using a mixed methods approach. In Study 1, we conducted qualitative interviews to reconceptualize general SDL notions and to propose a tailored value co-creation mechanism in PSPs. We then conducted quantitative studies in Study 2 using well-established measures to empirically test the hypothesis derived from the literature and

our qualitative research. In principle, our findings confirm the primary purpose of value creation, but they paint a more comprehensive picture of diverse values and their dependence in PSPs. We found that clients' value-in-use is a salient prerequisite for value-for-firm. This is particularly the case for non-monetary value-for-firm (e.g., enhanced reputation and business opportunities), as opposed to monetary value-for-firm (e.g. financial payments). This lends empirical support to the possible associations between various value outcomes in PSPs.

Our findings also show that project values are co-created for one another when professionals and clients integrate their operant resources through their interactions. These operant resources include professionals' knowledge and competence, clients' level of professional knowledge and client's motivation to interact with the professionals. Our finding on the client's professional knowledge is particularly important to value co-creation in PSPs. Given the knowledge-intensive nature of PSPs, clients who lack professional knowledge are more likely to perceive professional services as complex. This perceived high level of complexity can reduce clients' cognitive effort devoted to understanding services, which in turn can negatively affect their interactions with professionals and their perception of service quality (Mikolon et al., 2015). In contrast, clients with a high level of expertise will better understand professionals' ideas and ask questions, leading to positive interactions and value co-creation outcomes. This finding enriches our limited understanding of another important dimension of clients' knowledge besides those about their needs and business/market contexts in value co-creation in PSPs (Eisingerich and Bell, 2008; Mikolon et al., 2015).

The effect of professional ethics on professional-client interactions is inconclusive. Although we found a positive association between professional ethics and professional-client interactions in Study 2a, this relationship was nonsignificant in Study 2b. This inconclusive finding may be attributable to the potential interactive effects of professional ethics and other variables (e.g., personal beliefs), which may result in conflicting attitudes and behaviors (Wooten, 2001). For example, in the context of medical services, a doctor's religious beliefs may preclude the prescription of the morning after pill—in this case, the doctor's behavior is guided by his or her personal beliefs rather than professional ethics. This suggests that professional ethics on their own may be insufficient to predict professionals' behaviors in PSPs.

Similarly, the effect of client trust in professionals on value co-creation in PSPs was found to be more complex than the positive effects frequently proposed in prior firm-level SDL literature. While we did find a moderating effect, the direction of the predicted relationship was different from what we hypothesized. Specifically, we found a stronger positive relationship between the client's professional knowledge and professional-client interaction for low as opposed to high clients' trust in Study 2a. However, this finding was not replicated in Study 2b. Furthermore, the role of clients' trust in the relationship between clients' motivation to interact and the professional-client interactions was not supported in Study 2a; but partially supported in Study 2b. We found a stronger

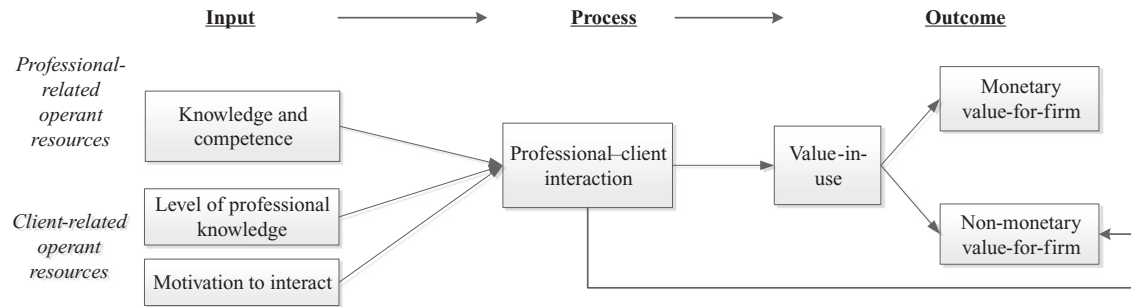


Fig. 4. Confirmed value co-creation mechanism in PSPs.

positive association between client's motivation to interact and the professional-client interactions for low as opposed to high clients' trust. These partially supported findings may be attributable to the temporary nature of PSPs in which professionals and clients are likely to be working together for the first time. In this case, professionals and clients in PSPs may start with a weak foundation of trust. Clients who do not trust professionals may involve themselves more in the project and use their professional knowledge to challenge the professionals' ideas, which, in turn, could lead to improved services and outcomes. Indeed, trust can be a double-edged sword—in some cases, it may facilitate knowledge and exchange of ideas, while in others, it may lead to a blind acceptance of the professional's judgment (Rashid and Edmondson, 2011). More research is warranted to fully understand the role of trust in value co-creation in temporary project contexts.

4.1. Theoretical implications

Fig. 4 illustrates the value co-creation mechanism in PSPs that has been confirmed by our findings. As one of the few studies to apply SDL theory to develop a more holistic value co-creation mechanism in PSPs, it is not our intention to establish an all-inclusive model. Rather, we view this research as an initial step toward this goal.

To this end, this research offers two important theoretical implications. First, this research employed a mix-methods approach (i.e., integrating a qualitative component and collecting dyadic survey data) drawing from multiple samples (i.e., four data sets) to empirically investigate the diverse and subjective values; and the roles of professionals, clients and their interactions in co-creating these values in PSPs. This rich empirical evidence not only contributes to a more in-depth understanding of how value is perceived in PSPs, who creates value, and for whom value is created, but it also adds to the limited empirical research that considers multiple stakeholders' perspectives in project value creation (Keeys and Huemann, 2017; Smyth et al., 2018). Both our confirmed (see Fig. 4) and inconclusive findings about the roles of professional ethics and client trust in value co-creation in PSPs provide rich opportunities for future research.

Second, it has been argued that theoretical development in project value creation research would benefit significantly by integrating theoretical perspectives from other disciplines

(Laursen and Svejvig, 2016). In this regard, we join an increasing number of scholars (Chang et al., 2013; Fuentes et al., 2019; Smyth et al., 2018) demonstrating the utility of SDL theory (i.e., a well-established service theory in marketing) as a theoretical lens to investigate value co-creation mechanisms in PSPs. Specifically, drawing from the SDL literature and our data, we analytically distinguished value from clients' and professionals' perspectives and empirically established the different levels of dependency among them. This consideration of value from both professionals' and clients' perspectives is one step forward in overcoming the theoretically incomplete one-dimensional value consideration in project value creation literature (Keeys and Huemann, 2017).

4.2. Practical implications

This research also offers several practical implications. To successfully manage and facilitate value co-creation in PSPs, professionals need to develop several new capabilities in addition to their project management knowledge and skills. First, professionals should continually develop their professional knowledge and relevant capabilities to effectively lead professional-client interactions to co-create value with their clients in PSPs. Such capabilities may include those to solicit clients' needs, to enhance social and emotional professional-client bonding, and to facilitate a coordinated process to co-create a service package (Karpen et al., 2012). In addition, given the importance of clients' professional knowledge and motivation to interact in value co-creation in PSPs, professionals should be more proactive in understanding and managing clients' professional knowledge. For example, professionals could assess their client's professional knowledge and desired level of involvement prior to the commencement of a PSP and, accordingly, develop interaction strategies and offer educational assistance if required. Such educational efforts can enhance not only clients' value-in-use (as clients now possess better knowledge to co-produce and utilize the service offerings) (Karpen et al., 2012) but also the professionals' trustworthiness (Eisingerich and Bell, 2008; Mikolon et al., 2015). Alternatively, professionals may use “adaptive selling” strategies to adapt their messages, ideas, and communication tactics to clients with different levels of professional knowledge (Mikolon et al., 2015). However, such adaptive selling strategies will be most effective when clients' perceived level

of service complexity is at a moderate level. This means that a certain level of education may still be necessary for those clients with a low level of professional knowledge.

Conversely, clients must understand that professionals can only facilitate their value-in-use but not create it for them. Therefore, it is important that they also invest sufficient effort and resources into the interaction process, such as actively clarifying their needs and providing professionals with necessary information and feedback. Clients must also acknowledge the limitations of their professional knowledge. This means that they should be open-minded about professionals' recommendations and be willing to address their concerns through collaborative discussions with professionals.

5. Limitations and future research

Although this research offers important insights into the inputs (i.e., professional- and client-related operant resources), process (i.e., professional–client interaction) and outcomes (i.e., various value types) of value co-creation in PSPs, some limitations should be noted and addressed in future research. First, this research focuses on PSPs, which are characterized by high levels of knowledge intensity and asymmetry, service intangibility, and direct professional–client interaction (Lewis and Brown, 2012). Given the restrictions on survey length, this research did not include other conditional variables. Future studies may thus replicate and extend this research to other project types and to include contextual variables (e.g., project size, phase, and duration) to investigate whether value co-creation practices vary across different project contexts and contextual conditions. For example, trust is found to be critical in collaborative professional–client relationships (Karpen et al., 2012) and project value co-creation (Matinheikki et al., 2016), but it takes time to develop. Therefore, it would be interesting to explore the effect of project duration, in other words the duration of the professional–client relationship, on trust and thereby its role in value co-creation in PSPs.

Second, informed by the SDL literature and our qualitative interview results, this research only examined the effect of four operant resources (i.e., two professional-related and two client-related factors) on professional–client interactions. Further work may investigate other operant resources and their potential additive effect on project value co-creation practices. For example, Fiske and Taylor (1984) argue that an individual must have certain cognitive capabilities (e.g., the ability to interpret information) and be motivated to act on information to become successful. Following this logic, motivated clients with sufficient professional knowledge should be able to interact more productively with professionals in PSPs. This potential additive effect of two client-related operant resources, in this case professional knowledge and motivation, on professional–client interactions can be further explored. The role of professional ethics and client trust in value co-creation in PSPs also warrants further theoretical and empirical attention. For example, in what ways and to what extent, a service provider's professional ethic may interact with his/her personal

conditions in shaping his/her behaviors and thereby the value co-creation mechanisms in PSPs?

Third, because of theoretical and empirical reasons, our research focused on how value is perceived and co-created by only two key stakeholders—professionals and clients—in PSPs and was based on data collected mainly from two countries—Taiwan and the US. The cultural differences between these countries may have partially contributed to the varying results obtained in Studies 2a (Taiwan) and 2b (USA). Future studies may take a network perspective to examine how a broader range of project stakeholders (e.g., supply chain partners and other users) influence and contribute to the value co-creation process (Keeys and Huemann, 2017) in diverse cultural contexts. The network perspective immediately calls attention to the role of joint sense-making and consensus building in value co-creation processes (Arto et al., 2016; Matinheikki et al., 2016). Project stakeholders may perceive value differently because of their various (and often conflicting) interests and goals in a project. Their involvement in and expectations from a project will also vary (Mills and Razmdoost, 2016). Further, the intangible and evolving nature of project value and offerings in PSPs can lead to role ambiguity in which it becomes difficult for project stakeholders to fully understand the expectations for them and others. Therefore, understanding different stakeholders' perspectives, resolving their value conflicts to build a shared vision in advance, and developing consensus about ideas throughout the entire project are critical to enable value co-creation (Arto et al., 2016; Matinheikki et al., 2016). Given the challenge of diverse stakeholders reaching agreement, it may also be interesting to examine how various levels of consensus among project stakeholders shape the value co-creation process and outcomes and whether minimum or optimal consensus levels exist for value co-creation across projects. Because of the significant effect of cultural norms on stakeholders' behaviors, interactions, and perception of value, it is critical for such studies to account for any cultural differences.

Fourth, future research may extend our project-level investigation to examine value co-creation mechanisms at other levels, including the program, portfolio and organizational levels, and the cross-level interface (Lepak et al., 2007; Martinsuo and Killen, 2014). For example, SDL scholars have emphasized the need for organizations to introduce routinized and coordinated mechanisms to support value co-creation practices (Karpen et al., 2012; Vargo and Lusch, 2016). Similarly, researchers may investigate organizational enablers, such as capability-building mechanisms, for project value co-creation in project-based organizations. Such insights are critical given that services are an important part of project-based organizations (Kujala et al., 2010; Wikström et al., 2010) and value co-creation is being increasingly adopted to improve project and firm performance (Mills and Razmdoost, 2016). These multiple- and cross-level insights, altogether, can contribute to a comprehensive understanding of the value creation phenomenon in projects (Vargo and Lusch, 2017).

Finally, in addition to expanding on theory, future studies may address our methodological limitations by collecting set data from multiple sources and utilizing longitudinal research

designs. Specifically, despite our efforts to collect professional–client dyadic data in Studies 1b and 2a, our quantitative data in Study 2b were based on self-reporting, which may be influenced by common method variance (Podsakoff and Organ, 1986). Therefore, future studies are recommended to collect set data from diverse stakeholders, including those in dyads, groups and networks, and objective data from multiple sources, including project reports and supervisor assessment of professional behaviors. In addition, given our cross-sectional research design, our study results were correlational and could only suggest relationships between variables. Further longitudinal research is warranted to confirm the causality of the study variables and understand the temporal dynamics of these relationships.

6. Conclusions

Drawing on the project value creation literature and SDL theory, this research formulated a more holistic view of the

value co-creation mechanism in PSPs. Data collected through qualitative interviews and quantitative surveys from four samples demonstrated a positive effect of professional–client interactions on the value created for professionals (i.e., value-for-firm) and clients (i.e., value-in-use). It further revealed various levels of dependence in the different forms of value—for example, non-monetary value-for-firm was more strongly dependent on clients' value-in-use than monetary value-for-firm. The professional knowledge of both professionals and clients as well as client motivation to interact with professionals were found to be critical operant resources in enabling productive professional–client interactions and value co-creation. However, the influence of professional ethics and client trust in professionals on value co-creation in PSPs is inconclusive, warranting further theoretical and empirical attention. This research opens up rich opportunities for scholars to integrate SDL theory to advance the project value creation literature and for practitioners to develop evidence-based strategies to facilitate value co-creation practices in PSPs.

Appendix A. Survey items used in Study 2

	Study 2a (Dyadic data collected from both professionals and their clients)	Study 2b (All professional-reported)
Professional knowledge and competence (PKC)	(Professional-reported) 1. I possessed the specialized knowledge required to successfully deliver the services. 2. I had accumulated sufficient experience to help the client achieve his/her goals. 3. I was capable of collecting and organizing information in different ways to help the client understand its meanings. 4. I was capable of developing solutions to address the client's needs. 5. I kept the client informed regularly about what services would be performed throughout the entire project. 6. I gave the client individual attention. 7. I had the client's best interests at heart. 8. I understood the client's needs. 9. I explained related concepts and my recommendations to the client in a meaningful way. 10. I gave the client as much information as he/she liked to have.	1. I possessed the specialized knowledge required to successfully deliver the services. 2. I was capable of collecting and organizing information in different ways to help the client understand its meanings. 3. I was capable of developing solutions to address the client's needs. 4. I kept the client informed regularly about what services would be performed throughout the entire project. 5. I explained related concepts and my recommendations to the client in a meaningful way.
Professional ethics (PE)	(Professional-reported) 1. I would not conceal an error I made. 2. I would not claim credit for someone else's work.	1. I would not conceal an error I made. 2. I would not claim credit for someone else's work.
Client's level of professional knowledge (CPK)	(Client-reported) 1. I understood all aspects of the services the professional provided. 2. I possessed good knowledge of the services and products that the professional offered.	1. The client understood all aspects of the service I provided. 2. The client possessed good knowledge of the services and products I offered.
Client's motivation to interact (CM)	(Client-reported) 1. I was motivated to participate in the entire process. 2. I was motivated to interact with the professional.	1. The client was motivated to participate in the entire process.

(continued)

	Study 2a (Dyadic data collected from both professionals and their clients)	Study 2b (All professional-reported)
Client's trust in the professional (CT)	(Client-reported)	1. If the client was unable to monitor my activities, he/she would be willing to trust me to get the job done right. 2. The client trusted me to do things he/she was incapable of doing.
Professional-client interaction (PCI)	(Both professionals and clients reported on this study variable on the same set of items. Items presented below were used in the professional's questionnaire.)	1. The meetings with the client produced novel insights. 2. The client clearly explained what he/she wanted me to do. 3. The client performed all his/her required tasks. 4. The client let me know if he/she had a useful idea on how to improve services I provided.
Value-in-use (VIU)	Not applicable.	1. The services I provided have high quality. 2. The recommendations I made addressed the client's needs. 3. The services I provided offered good value for money.
Non-monetary value-for-firm (NMVF)	Not applicable.	1. I believe the client will say positive things about me to other potential clients shall the opportunity arises. 2. I believe the client will recommend me to other potential clients shall the opportunity arises.
Monetary value-for-firm (MVF)	Not applicable.	1. We made reasonable profit for the services I provided. 2. The fees we received for this project were comparable with other similar services I provided to other clients.

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