



Agency relationships of project-based firms

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ABSTRACT

Throughout the project life cycle, project-based firms (PBFs) rely on various agents, such as subcontractors and consultants, to carry out activities on their behalf. Although a considerable body of literature has discussed when and how PBFs use agents, little is known about the nature of the agency relationships between PBFs acting as principals and their agents and how these relationships may be associated with the practices used by PBFs to govern their agents' behaviour. The purpose of this conceptual study is to provide further insight into the characteristics of PBFs' agency relationships and to identify and describe alternative approaches used for managing them. Our analysis reveals that PBFs' agency relationships differ significantly regarding actor goals, risks, and availability of information across the project life cycle. Based on our findings, we propose a typology of the upstream agency relationships of a PBF consisting of four ideal types: operational, trustful, volatile, and strategic agency relationships. We argue that the development of agency relationships is a dynamic process which is contingent to the temporal orientation of the principal and the agent as well as congruence of goals between the principal and the agent.

1. Introduction

Due to the inherent complexity and broad scope of project deliveries, PBFs often choose to draw on the expertise of various actors such as sales agents, subcontractors, or consultants who perform activities on the PBF's behalf during the different phases of a project life cycle. These actors adopt agency roles by participating, for example, in the marketing and implementation of solutions offered by their principal, the PBF (Blomquist & Wilson, 2007). Later, when the project deliverable has been handed over to the client, different agents such as service providers may again be used to support the client of the PBF in using the delivered solution, e.g., a manufacturing process (e.g., Momeni & Martinsuo, 2019b).

Earlier research has highlighted several reasons why PBFs may prefer to rely on agents instead of carrying out the corresponding tasks in-house. First, developing a network of sales agents may help the PBF reduce marketing costs by enabling it to establish a presence in multiple market areas without making significant investments in sales offices (Cova et al., 2002; Rapp, 2009). Second, during project implementation, the utilisation of agents, such as subcontractors situated close to the customer, may increase the cost-efficiency of project implementation, in contrast to using a contractor that transfers its resources and personnel to each customer site as needed (Aaltonen et al., 2008). Third, providing

the customer with operational services such as maintaining customer equipment and supplying spare parts on short notice is often feasible only when the PBF relies on service providers situated close to the customer (Heikkilä et al., 2005).

Although extant project research has discussed the use of agents across the project life cycle, the characteristics of agency relationships have not been systematically studied. In addition, it is not adequately understood how PBFs govern the behaviour of their agents under differing contextual circumstances. Indeed, a thorough understanding of how agency relationships are used across the project life cycle would likely support PBFs in their efforts to develop and maintain agency relationships, contributing to the success of their project deliveries. Additionally, project research has focused predominantly on downstream agency relationships between PBFs and their customers in which the PBF serves as the agent for the customer which acts as the principal (e.g., Badenfelt, 2010; Bond-Barnard et al., 2013; Liu et al., 2014; Zhang & Qian, 2017) and on agency relationships internal to the PBF, e.g., between the project owner and the project manager (Turner & Müller, 2003; Müller & Turner, 2005; Karlsen, 2010; Zwikael et al., 2019). Hence, research on upstream relationships in which the PBF as assumes the role of the principal that utilizes various agents can be considered as necessary.

To advance the understanding of PBFs agency upstream

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relationships, we draw on previous project research and literature on agency theory, with the aim of uncovering central features of agency relationships throughout the project life cycle, ranging from project sales and marketing to the operations phase. In addition to describing the characteristics of various agency relationships of PBFs, we focus on alternative approaches PBFs can use to govern the behaviour of their agents. Specifically, we address two research questions:

- 1 *What features characterise upstream agency relationships of project-based firms?*

And,

- 1 *How do project-based firms govern the behaviour of their agents?*

Based on a review of project research and the vast literature on agency theory, this conceptual paper explores as well as dimensionalizes knowledge on the prevalence and nature of PBFs' agency relationships as well as the mechanisms through which PBFs monitor and control the behaviour of their agents. Our analysis reveals that agency relationships of PBFs differ significantly regarding actor goals, risks, and availability of information across the entire project life cycle. Based on the findings, we propose a typology of the agency relationships of a PBF consisting of four ideal types: operational, trustful, volatile, and strategic agency relationships. Further, we argue that the development of agency relationships is a dynamic process which is contingent to the temporal orientation of the principal and the agent as well as congruence of goals between the principal and the agent.

The paper is structured as follows. We first discuss the use of agents across the project life cycle (project marketing and sales, implementation, and operations). Then, we draw on the agency-theory literature to clarify the nature of agency relationships, developing an analytical framework that allows us to focus on specific elements of the relationships, including the goals of involved actors, information asymmetry among the principal and the agent, sharing of risks in the relationship, and monitoring and control of agent behaviour. Finally, we discuss the implications of this study for both theory as well as practice and provide avenues for further research.

2. Use of agents across the project life cycle

PBFs regularly face discontinuity, uncertainty, and complexity in their operations (Mandják & Veres, 1998; Gerald et al., 2011). These conditions give rise to several challenges, many of which may be addressed by using agents. For example, as maintaining active customer relationships in project business is often difficult due to a lack of continuous project transactions between PBFs and their clients, PBFs may utilise local maintenance partners that provide maintenance services to customers on their behalf (Davies 2004; Windahl & Lakemond, 2006). Moreover, PBFs that operate in geographically and culturally distant markets may utilise the services of various expert actors that are tightly connected with the local context (Cova et al., 2002; Aarikka-Stenroos et al., 2018). Finally, the increasing technological complexity of project deliveries has prompted PBFs to focus on their core competencies and outsource noncore activities to various subcontractors (Davies & Brady, 2000), many of which are situated conveniently in close proximity to the customers (Du et al., 2016). In the following, we discuss in detail how PBFs may use different agents across a project's life cycle, beginning with the marketing and sales phase and ending with the operations phase.

2.1. Agents in project marketing and sales

To remain profitable, a PBF must secure project deliveries in a continuous manner. This necessity may pose a challenge, because project business is characterised by discontinuity between transactions

(Hadjikhani, 1996). This discontinuity affects the formation and the characteristics of buyer–supplier relationships, as a specific customer buying a solution is unlikely to purchase another solution from the supplier for a long period of time. To alleviate this problem, PBFs frequently serve a large base of customers that buy solutions rather infrequently. In many industries, such as energy and paper production, it is necessary for the PBF to offer its solutions to customers in multiple markets if it is to achieve a sufficiently large customer base. However, collecting information about potential markets and establishing a credible functional and relational position in them represents a tremendous challenge. For example, Ahola et al. (2013) discussed how it took a major automation-system provider multiple years to establish a market position credible enough to secure the first project delivery in a new market region.

PBFs often respond to the above-mentioned challenges by the use of agents. Cova et al. (2002) examined how PBFs resort to external consultants to collect information about target markets and potential project opportunities within them. Particularly in public–private partnership projects, PBFs may need to seek external funding institutions' support to help their customers secure funding for the project (Smyth & Edkins, 2007). Ahola et al. (2008) investigated how shipyards involve some of their main technology subcontractors in sales negotiations with their potential clients; these firms can suggest novel and innovative features valued by the ship operators. Recent research conducted in the context of the construction industry has yielded similar findings regarding the influence of designers in improving the suppliers' position in a project network (Martinsuo & Sariola, 2015; Sariola & Martinsuo, 2016).

In drawing on the expertise of commercial actors, the involvement of noncommercial actors adopting an agency role may also support the project marketing activities of the PBF. Ahola et al. (2013) provided an example of an automation-system provider that was expanding to a new market area and entered into a collaborative relationship with a local university, which was well connected to potential buyers of automation systems in the region. Customers of automation systems considered the university a leading expert in the field, and these customers consequently consulted the organisation when planning new investments. When consulting the customers, the university recommended technologies mastered by the focal automation-system provider, thereby taking on an agency role.

2.2. Agents in project implementation

The implementation of projects is characterised by the challenges of coordinating the design of, assembling, and installing technologically complex systems, and integrating them into the clients' operational production processes. Research on the provisioning of integrated solutions has highlighted the capability of integrating the deliveries and technologies of multiple suppliers as a key driver of PBFs' business success (Prencipe et al., 2003; Davies 2004; Jaakkola & Hakanen, 2013). Instead of taking on the responsibility of vertical integration, PBFs assume the role of a systems integrator, relying on the extensive use of agents for both system components and labour (Prencipe, 1997).

PBFs rely on local subcontractors for various labour-intensive tasks, such as groundwork and installation activities, that need to be carried out at the customer's site (Aaltonen & Sivonen, 2009). They do so because using agents can be more cost-efficient than utilising the firm's own personnel, who would need to travel back and forth between the PBF's base of operations and the customer site, resulting in additional costs. Previous research has also emphasised that PBFs may choose to rely on local actors for the manufacturing of specific project sub-assemblies that can be cost-efficiently sourced locally or are expensive to transport over long distances (Aaltonen et al., 2008). For example, in the excavative industry context, large reactor vessels are manufactured close to their destination, because they are relatively simple to produce yet expensive to transport due to their size and weight. Finally, PBFs

may also rely on local expertise-providing agents, such as specialised consultants, to secure access to valuable local knowledge and competence that is highly tacit by nature, such as insights and processes for dealing with local authorities and obtaining permits required for the project to proceed (Tuuli et al., 2010; Bond-Barnard et al., 2013).

2.3. Agents during the operations phase

The operations phase, during which the customer is operating the delivered solution, may provide the PBF with opportunities for service delivery. PBFs may offer many kinds of services, including consulting, ramp-up support, process outsourcing, technical training, optimisation or operation of the delivered asset, maintenance of assets, and delivery of spare parts (Wikström et al., 2009; Rabetino et al., 2015). Through providing such services, the PBF can strengthen its solution offerings and its customer relationships, which may in turn contribute favourably to future project sales (Kujala et al., 2013; Momeni & Martinsuo, 2019b). Because downtime in customers’ production processes is generally very costly, customers require support services to be available on short notice, often within a specified number of hours. If the PBF’s customers are geographically dispersed, establishing capabilities to serve any of its customers requiring assistance in a matter of hours represents a challenge in which agents often play a central role.

During the operations phase, typical agency relationships concern the PBF’s local maintenance partners, spare parts suppliers, and related logistics service providers, which may provide services and act as liaisons between the PBF and its customers (Gebauer et al., 2013; Ferreira et al., 2013) and may even supplement or replace the PBF’s own services. PBFs may engage software and information system suppliers that can enable information management as well as remote monitoring and analytics capacities for the customer or the PBF itself (Windahl & Lakemond, 2006; Jaakkola & Hakanen, 2013; Turunen et al., 2018). Fuentes et al. (2019) investigated examples of public organisations outsourcing various project-related services to external service suppliers and identified both challenges and benefits, particularly in terms of the end user’s service experiences. When agents are involved in such interorganisational services, they may understand the client firm’s expectations but not necessarily those of the individual end users. Finne & Holmström (2013) characterised a triadic setting between a technology supplier, a systems integrator (as the service provider), and an end user and illustrated the technology supplier’s loss of the direct end-user service interface, when the systems integrator took charge of the service delivery. This caused suboptimal maintenance of the technology supplier’s product. Momeni & Martinsuo (2019a) examined a complex systems integrator who utilised distributors in its global system deliveries. These distributors sold systems in a given region but also provided services, such as spare parts and maintenance, and engaged in day-to-day customer interaction on behalf of the systems integrator.

2.4. Role of agents in project deliveries

Based on the preceding review, PBFs use a wide variety of agents for a broad range of activities, such as sales and concept development during the project’s front-end phase (sales agents, engineering consultants), design and delivery during project implementation (designers, consultants, suppliers, subcontractors), and service delivery during the operations phase (external service providers for training, use, maintenance, distribution, and problem solving). Fig. 1 summarises the various types of agents used across the project life cycle.

Identifying the various agents used by PBFs across the project life cycle leaves unanswered the question regarding the nature of the agency relationships binding these actors together. We do not know whether the relationships are highly similar in nature or whether their characteristics vary considerably depending on the project’s life cycle phase. We also do not know how PBFs actively manage relationships with their agents or whether the managerial approaches used are contingent characteristics of the PBF, the agent, or their relationship.

3. Conceptual development

The contributions of this paper rely on a review of literature on agency theory and research on project organising. A central objective of our review was to conceptualise and map agency relationships of PBFs throughout the project life cycle and identify potential relations between specific types of agency relationships and how they are governed. To work towards this objective, we sought empirical papers on agency relationships and agency problems in project research, with focus on PBF as the principal and another firm as the agent. Only content written in English and published in peer-reviewed journals, books or book chapters was included. Journals such as *International Journal of Project Management*, *Project Management Journal*, *International Journal of Managing Projects in Business*, *Construction Management and Economics*, and *Industrial Marketing Management* served as a starting point for papers included in this study, and a snowball approach was consequently adopted, where we explored the reference lists of the relevant articles and identified additional relevant papers. In addition, seminal papers (e.g., Eisenhardt, 1989; Bergen et al., 1992) on agency theory from other sources were included to summarise the main aspects of agency theory. While we started the search with search terms that stem directly from agency theory (e.g., agency theory, agency problems, agent, information asymmetry, goal conflict, monitoring and control and risk management), we later continued our search more liberally, handpicking articles that covered these themes implicitly and dealt with agency relationships of PBFs. In line with this logic, articles dealing with intra-firm issues and other organisations than PBFs as the principal were excluded. Manual screening of each article’s title, abstract and key words was conducted and, eventually, relevant articles were read through and included in consequent analysis.

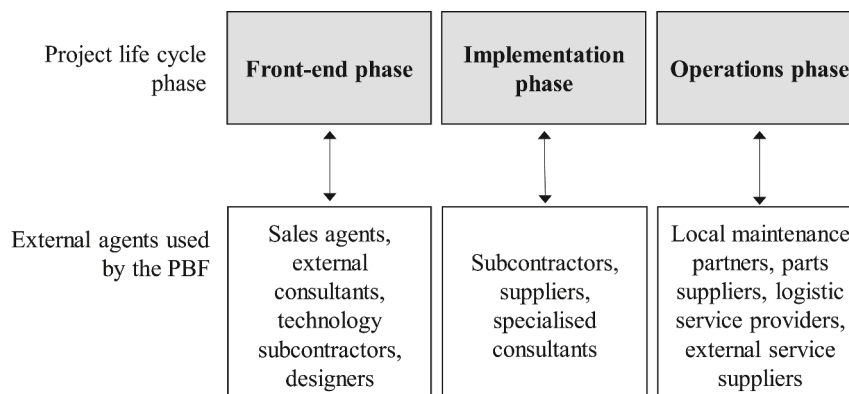


Fig. 1. Use of agents in the various phases of the project life cycle

When analysing the articles, multiple factors were systematically considered, including: context of the study (e.g., construction industry), project life cycle phase addressed (front-end, implementation, operations), description of principals and agents investigated (such as type of PBF and consultant), and specific agency problem addressed (goal incongruence, information asymmetry, related risks, and monitoring and control). As settings in these different studies were diverse and all issues were not covered in every paper. The analysis process was iterative in nature and included many meetings during which the authors met to discuss the emerging concepts and linkages between them. The analysis eventually resulted in the framework for analysing agency relationships in project-based firms (Fig. 2 shown later) and thematic categorisation of the characteristics of these relationships (Table 1 shown later).

4. An agency-theoretical perspective on projects

4.1. Agency theory

Agency theory is concerned with problems that may occur when a principal uses an agent to act on its behalf and with how these problems may be mitigated. In the literature, agency problems are frequently divided into two categories: adverse selection and moral hazard (Eisenhardt, 1989; Bergen et al., 1992). Adverse selection concerns challenges existing before the establishment of the agency relationship, covering issues such as reliably assessing the capabilities and goals of the agent. Acquiring reliable information about agent candidates is often difficult; to secure a contract with the principal, candidates may seek to mislead the principal by advertising capabilities they do not actually possess. Moral hazard relates to challenges that may occur after the principal and agent have engaged in a contractual relationship, that is, how the agent's performance should be evaluated and rewarded when it is acting on the behalf of its principal and how the principal may protect itself from malfeasance by the agent. For example, because a firm's profits are used to pay dividends to owners as well as salaries to management, a conflict between the principal and agent may arise if the principal demands increased dividends while the agent (management) strives for increased salaries (Anderson & Oliver, 1987). Depending on the context and the specific features the agency relationship, the principal typically seeks to mitigate agency problems by resorting to various monitoring and control mechanisms, including performance-based contracts, forcing the agent to share some of the principal's risks (e.g., by buying equity), or developing long-term collaborative relationships with the agent.

Agency theory has received considerable attention in the disciplines of economics, finance, organisational behaviour, sociology, political science, and marketing (Anderson, 1985; Bergen et al., 1992; Merrit & Newell, 2001; Misra et al., 2005). It has been applied to diverse settings,

covering issues both internal and external to the focal firm (Eisenhardt, 1989). Most frequently, agency theory has been applied to organisational phenomena such as vertical integration (Anderson, 1985; Lafontaine & Slade, 2007), management compensation (Anderson & Oliver, 1987; Misra et al., 2005), board relationships (Fama & Jensen, 1983), and acquisition and diversification strategies (Amihud & Lev, 1981; Chirico et al., 2020). While agency theory assumptions have been influential for example in shaping corporate governance systems (Eisenhardt 1989; Biesenthal & Wilden, 2014) the theory has its limitations. Agency theory is economics oriented (e.g., relationships based solely on economic motivations), and the underlying assumption is that agents and principals seek self-interest and therefore, may act opportunistically (Eisenhardt, 1989; Bendickson et al., 2016). The theory is also limited in addressing multiple concurrent contracts and relationships simultaneously and considering multiple interests stemming from a diverse network of stakeholders (Bendickson et al., 2016).

4.2. Framework for analysing agency relationships of project-based firms

Agency theory is founded on assumptions related to self-interest of and goal incongruence between actors, focus on efficiency, information asymmetry between actors, and risk aversion (Eisenhardt, 1989; Bendickson et al., 2016). Previous research in project organising adopting an agency perspective covers both empirical (Mahaney & Lederer, 2011; Forsythe et al., 2015; Snippert et al., 2015; Joslin & Müller, 2016;) and conceptual work (Farrel, 2003; Müller & Turner, 2005; Sha, 2011; Chang, 2015; Liu et al., 2016). Earlier research has identified and discussed agency problems from a number of perspectives including monitoring the performance of agents (Mahaney & Lederer, 2011; Biesenthal & Wilden, 2014; Toivonen & Toivonen, 2014; Joslin & Müller, 2016; Müller et al., 2016), communication and trust between the project principal and the agent (Müller & Turner, 2005; Zwikael & Smyrk, 2015; Romero-Torres, 2019), selection of agents (TysseLand, 2008; Liu & Yuliani, 2016), and information asymmetry (Karlsen, 2010; Forsythe et al., 2015; Zheng et al., 2017).

The alignment between the goals of the principal and the goals of the agent is central in agency relationships. In the theoretical case, in which the goals of the two actors are perfectly aligned, the agent will work towards fulfilling the principal's (and simultaneously its own) goals to the best of its ability. However, in practice, the goals of the two actors are never perfectly aligned, and the principal needs to establish certain means of influencing the agent's goals to bring them into sufficient alignment with its own (Müller & Turner, 2005; Zheng et al., 2017). For example, the principal may monitor the agent and reward it based on its satisfaction with agent performance. In the context of project business, incongruence between the goals of the PBF and its agent is a typical condition. For example, research carried out in the context of the construction industry has discussed situations in which subcontractors purposefully maximise the number of changes to the project scope to increase the amount of high-margin additional work for which their principal will need to pay (Xiang et al., 2015).

The concept of information asymmetry refers to the (typical) situation in which one actor has information that is not openly shared with the other actor. Previous literature has associated information asymmetry with increased likelihood of opportunistic behaviour, usually by the agent (Eisenhardt 1989; Müller & Turner, 2005) but in some cases by the principal (Snippert et al., 2015). For example, the agent may be aware of quality problems related to work it has carried out but does not disclose this information to the principal, as doing so might negatively affect the agent's compensation. The principal may also benefit from withholding information from its agent. For example, the principal could refrain from sharing information about the agent's competitors' pricing in order to reduce the likelihood of the agent increasing its pricing. In project organising, information asymmetry is a typical condition. Specifically, the literature has discussed examples of gold plating, that is, contractors selling unnecessary features to project clients that

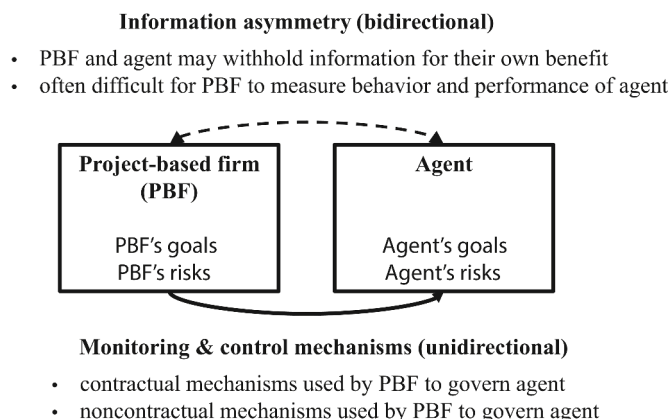


Fig. 2. Framework for analysing agency relationships of the project-based firm

Table 1
Characteristics of PBFs' upstream agency relationships

	Agency relationships in front-end phase	Agency relationships in implementation phase	Agency relationships in operations phase
	<i>Sales agents, external consultants, technology subcontractors, designers</i>	<i>Subcontractors, suppliers, specialised consultants</i>	<i>Local maintenance partners, parts suppliers, logistic service providers, external service suppliers</i>
Actor goals			
Examples of goals of the principal	<ul style="list-style-type: none"> • Revenues from additional project deliveries (Ahola et al., 2013; Tikkanen et al. 2007) • Establishing new customer relationships (Cova & Hoskins, 1997; Tikkanen et al. 2007) • Maintaining existing customer relationships (Cova et al., 2002, Skaates et al., 2002) 	<ul style="list-style-type: none"> • Cost-efficient subcontracting of work (Manu et al., 2015; Tarziján & Brahm, 2014) • Access to resources and competencies (Tikkanen et al. 2007) 	<ul style="list-style-type: none"> • Revenues from service provisioning (Kujala et al., 2013; Arto et al., 2008; Tikkanen et al. 2007) • Information about customer satisfaction and learning from the customer (Arto et al., 2008) • Information about customer needs (e.g. potential future project purchases) (Arto et al., 2008, 2015)
Examples of goals of the agent	<ul style="list-style-type: none"> • Share of revenues from project sales (Cova et al., 2002 Skaates et al. 2002; Ojansivu & Alajoutsijärvi, 2015, Tikkanen et al. 2007) • Maintaining existing base of customer relationships and establishing new ones (Ahola et al. 2013; Tikkanen et al. 2007) 	<ul style="list-style-type: none"> • Revenues from work subcontracted by principal (Tikkanen et al. 2007) • Maintaining its existing base of customer relationships and establishing new ones (Tikkanen et al. 2007) 	<ul style="list-style-type: none"> • Revenues from additional service provisioning (Momeni & Martinsuo, 2019) • Establishing new customer relationships (Momeni and Martinsuo, 2019) • Creating new markets (Turunen et al. 2018)
Information asymmetry			
Information that may be exclusive to the principal	<ul style="list-style-type: none"> • Total sales volume of principal (Xiang et al., 2015) • Expected project profitability (Xiang et al., 2015) • Agent's share of expected profit (Schieg 2008) 	<ul style="list-style-type: none"> • Description of scope of project delivery (Xiang et al., 2015; Liu et al., 2016) • Project profitability (Xiang et al., 2015) • Current status of work progress (project-level) (Sturts Dossick & Shunk 2007) 	<ul style="list-style-type: none"> • Product knowledge critical to service operations (Finne & Holmström 2013) • Long-term history of the customer relationship (Arto et al. 2008, Rabetino et al. 2015)
Information that may be exclusive to the agent	<ul style="list-style-type: none"> • Identities of potential clients (Blomquist & Wilson 2007; Ojansivu & Alajoutsijärvi 2015; Cavusgil and Zou 1994) • Customers' (including potential new customers for principal) purchase history (Rapp 2009) • Sales effort and sales techniques used (Ojansivu & Alajoutsijärvi 2015) • Information about the principal's competitors' marketing strategies (Rapp 2009) • Success rate of sales (Frazier et al., 2009) • Preferences of individual customers (in terms of offerings of principal and its competitors) (Frazier et al., 2009) 	<ul style="list-style-type: none"> • Current status of work progress (subcontracted work) (Xiang et al., 2015; Badenfelt, 2010) • Potential problems in executing work (e.g., resource shortage or changes required) (Forsythe et al., 2015) • Quality problems noticed during execution of work (Xiang et al., 2015; Liu et al., 2016) 	<ul style="list-style-type: none"> • Location and context of installed base and end users (Finne & Holmström 2013) • Novel data combinations from various sources (Turunen et al. 2018) • Preferences of individual customers (in terms of offerings of the principal and its competitors) (Finne & Holmström 2013)
Sharing of risks			
Potential risks faced by the principal	<ul style="list-style-type: none"> • Loss of market potential (poor agent sales performance) (Rapp, 2009; Zeng et al., 2015) • Agent's opportunistic or unethical behaviour (Matthyssens et al. 2003; Wu et al. 2007; Zeng et al., 2015) • Agent gains access to principal's manufacturing know-how and creates competing offerings (Wu et al. 2007) 	<ul style="list-style-type: none"> • Quality problems in deliverable of subcontractor (Manu et al., 2015; Xiang et al., 2015; Forsythe et al., 2015; Lee et al. 2009) • Subcontractor attempts to increase scope of agreed-upon work (to increase profitability) (Kadefors, 2004; Forsythe et al., 2015) • No subcontractors available at a reasonable price level (Wang & Zhang, 2004; Lahdenperä 2016) 	<ul style="list-style-type: none"> • Customer dissatisfaction, due to suboptimal product maintenance (Finne & Holmström 2013) or agent's poor quality (Fuentes et al., 2019) • Reputation is dependent on agents' performance (Jaakkola & Hakanen 2013) • Principal may become distanced from its customers (Helander & Möller, 2007; Finne & Holmström 2013) • Excessive dependence on specific agents (Jaakkola & Hakanen 2013)
Potential risks faced by the agent	<ul style="list-style-type: none"> • Agent carries costs of failed sales attempts • Principal takes control of relationships to customers (Wu et al. 2007) • Principal establishes own sales unit in region (replacing agent) (Gadde, 2014) • Principal forces its agents to compete with each other (lowering profitability) 	<ul style="list-style-type: none"> • Subcontractor cannot carry out work as planned (e.g. preceding work tasks are late) (Sturts Dossick & Shunk 2007) • Changes in the design that may result in delays in the original schedule (Atkinson et al., 2006) • Subcontractor faces financial sanctions (e.g., due to failure to maintain agreed-upon schedule) (You et al., 2018) 	<ul style="list-style-type: none"> • Limited potential to affect timetables and decisions – wasted R&D effort and challenges with profit potential (Jaakkola & Hakanen 2013) • Lack of trust (Jaakkola & Hakanen 2013) • Loss of contact with customers (Jaakkola & Hakanen 2013) • Large upfront investment, no guarantee of later profit (Jaakkola & Hakanen 2013)
Monitoring and control of agent			
Evaluation of agent performance	<ul style="list-style-type: none"> • Output-based (e.g., number and size of deals closed with new customers) (Ojansivu & Alajoutsijärvi, 2015; Aulakh & Genturk, 2000) • Behaviour-based (e.g., customer feedback, development of risk, project and quality plans, etc.) (Lin et al., 2019; Aulakh & Genturk, 2000) 	<ul style="list-style-type: none"> • Characterised by more output-based measures (quality of deliverable; meeting the expectations specified in the contract) (Manu et al., 2015; Badenfelt, 2010; Lin et al., 2019) • Other types of control modes (behaviour, self-, and clan control) can be utilised depending on the industry, task characteristics, and environmental uncertainties (Lin et al., 2019; Zwikaël & Smyrk, 2015) 	<ul style="list-style-type: none"> • Output-based (e.g., volume of services provided) (Robinson & Scott, 2009) • Behaviour-based (e.g., customer satisfaction) (Robinson & Scott, 2009)
Examples of control mechanisms	<ul style="list-style-type: none"> • Agent barred from simultaneously representing principal's competitors (Bergen et al., 1992) • Transaction-based agent compensation (Cova et al., 2002; Müller & Turner 2005) 	<ul style="list-style-type: none"> • Subcontractor quality audits (Ahola et al. 2017) • Evaluation of delivered work (Manu et al., 2015; Badenfelt 2010) • Incentives for high performance (Chang 2014) 	<ul style="list-style-type: none"> • Contracts and ownership arrangements (Jaakkola & Hakanen, 2013) • Mapped processes (Jaakkola & Hakanen, 2013)

(continued on next page)

Table 1 (continued)

Agency relationships in front-end phase	Agency relationships in implementation phase	Agency relationships in operations phase
<ul style="list-style-type: none"> • Profit-sharing arrangements (Schieg 2008) • Risk-sharing arrangements (Müller & Turner 2005; Wang & Liu 2015) • Agent needs to commit to investments in developing expertise in selling principal's technologies & offerings (Bergen et al., 1992) 	<ul style="list-style-type: none"> • Detailed contractual specifications and close monitoring (Kadefors, 2004; You et al., 2018) 	<ul style="list-style-type: none"> • Specified collaboration levels (Finne & Holmström 2013) • Principal's investments in agent training (Jaakkola & Hakanen, 2013, Finne & Holmström 2013)

lack experience in defining the project scope (Forsythe et al., 2015). In addition, several empirical studies have shown how subcontractors may hide information related to poor progress of quality of work from their principals (Lu et al., 2016; Zhang & Qian, 2017). As information asymmetry is a central element of all agency relationships, developing governance mechanisms for reducing opportunistic behaviour lies at the heart of agency theory (Snippert et al., 2015).

In agency relationships, both the principal and agent agree to carry certain risks in exchange of compensation or other benefits received from the relationship. For example, when the owners of a PBF, represented by a board (principal), hire a new CEO (chief executive officer, agent), they are aware that if the CEO fails to perform acceptably, they will lose a share of their investment in the company. Similarly, the CEO carries the risk of her/his reputation being unfavourably affected, potentially harming career development. Transferring risk from the principal to the agent also usually involves a cost, a risk premium paid to the other party. Thus, the preferences and capabilities of both the agent and the principal with respect to risk need to be considered when establishing and governing agency relationships (Eisenhardt, 1985; Anderson & Oliver, 1987; Eisenhardt, 1989). A feature of project business is that the risks of the principal and agent are often interconnected. For example, if a subcontractor involved in a delivery project fails to perform acceptably and ends up in bankruptcy, the principal may need to quickly secure another contractor at a much higher rate, because its services are needed urgently to maintain (or catch up with) the project schedule.

Measuring and controlling agent performance is a major challenge. Previous research has identified several factors contributing to this difficulty: achieving the outcomes desired by the principal typically requires an extended period of time; the outcomes can be abstract in nature (such as strengthening the brand of the principal); and the achievement of the outcomes may require contributions from both the agent and the principal (Eisenhardt, 1989; Bergen et al., 1992). A rich spectrum of monitoring and control mechanisms are used by principals to govern their agents. The extant literature has outlined three distinct types of control: process control, output control, and social control (Ouchi, 1979). Process control refers to behaviour-based contracts, that is, how the actor is expected to perform its tasks; and output control to outcome-based contracts, that is, the measurable outputs of tasks. Organisational theory complements this view by including the aspect of social control (noncontractual governance mechanisms), which refers to agency relationships in which monitoring takes place through informal interpersonal interactions, such as meetings and informal discussions (Eisenhardt, 1985). In socially controlled relationships, the involved actors are expected to cooperate to achieve joint goals (Ouchi & Maguire, 1975; Aulakh & Genturck, 2000). In a project context, Turner & Cochrane (1993) introduced the goals-and-methods matrix for the context of project organising. In their model, the choice of an appropriate control mode is contingent on how well both the project goals and the methods for reaching them can be defined in advance. Summarizing the above discussion, Fig. 2 illustrates the analytical framework developed for the present study.

5. Characteristics of the project-based firm's agency relationships

In this section, we apply the above derived analytical framework to analyse related research on project organising. Following the structure of the framework in Fig. 2, we concentrate our discussion on actor goals, information asymmetry, risks, and governance in principal-agent relationships.

5.1. Actor goals

Because each project actor is guided by its own business goals, goal incongruence is a typical condition. As a result, agents may be prone to optimising their own revenues as opposed to focusing on the interests of their principals (Müller & Turner, 2005). For example, individual sales agents may simultaneously represent multiple principals that compete with each other, resulting in situations in which serving one principal conflicts with the interests of another (Bergen et al., 1992). Typical goals for PBFs include profitable development of a market position in selected markets (Ahola et al., 2013) and establishing new and maintaining existing customer relationships (Cova & Hoskins, 1997; Tikkanen et al., 2007), whereas their agents target secure sales commissions and maintaining their customer relationships (Skaates et al., 2002; Ojansivu & Alajoutsijärvi, 2015). In the project implementation phase, PBFs tend to emphasise cost-efficient subcontracting of work (Tarziján & Brahm, 2014; Manu et al., 2015) and access to complementary resources and capabilities (Tikkanen et al., 2007), whereas their agents (such as subcontractors) aim at achieving additional revenues as well as strengthening the business relationship with the principal (Tikkanen et al., 2007). In addition to industrial clients, goal incongruence is a common condition in public-private partnership (PPP) projects. Public clients often emphasise the social benefits of the project (which come at a cost), whereas both private investors and project suppliers tend to prioritise a high return on investment (Liu et al., 2016).

Actor goals may lack alignment during any of the project life cycle phases. The research on project-related services more typically covers either the principal's (Tikkanen et al., 2007; Arto et al., 2008, 2015; Kujala et al., 2013) or the agent's (Turunen et al., 2018; Momeni & Martinsuo, 2019a) goals. The PBF's goals during the operations phase usually relate to revenues from service provisioning and information about customer satisfaction and customers' future project needs (Arto et al., 2008, 2015). The agent's goals are often related to gaining revenues from the service provisioning and establishing new customer relationships (Momeni & Martinsuo, 2019a) as well as creating new markets (Turunen et al., 2018). For example, Robinson & Scott (2009) examined PPPs in the United Kingdom during the operations phase and determined that the client sought to maximise its utility by demanding the level of services stipulated in the contract and reducing transaction costs associated with monitoring compliance, whereas the suppliers sought to increase performance-related payments while avoiding deductions for failures to achieve the service levels agreed upon with the client.

5.2. Information asymmetry

Information asymmetry is a characteristic of all agency relationships even though these asymmetries are often actively mitigated by the involved actors. Most studies of information-asymmetry issues in the project literature have addressed the implementation phase of projects, and research focusing on information asymmetry in the front-end and operations phases is virtually nonexistent. As an exception, Xiang et al. (2015) investigated the probability and impacts of information-asymmetry phenomena among owners, contractors, and supervisors in construction projects by addressing the bidding phase in addition to implementation phase. They found that the principal's financial standing and the agent's technical and management capabilities were among the highest sources of information asymmetry in the bidding phase.

Information that may be exclusive to PBFs in the front-end phase is often related to total sales volumes of principals and expected project profitability (Xiang et al., 2015). In addition, the principal may refrain from disclosing information about project profitability in order to prevent the agent from using it as a leverage in price negotiations with its principal (Schieg, 2008). Agents possess information about the identities of potential clients (Blomquist & Wilson, 2007), as well as about their past purchasing activities (Rapp, 2009; Frazier et al., 2009), that they are unlikely to share with the principal. Additionally, because agents often serve multiple principals, they may possess information regarding strategies used by their principals' competitors, customers' purchase history and preferences (Rapp, 2009; Frazier et al., 2009), or the success rate of the sales (Frazier et al., 2009).

Focusing on the project implementation phase, Liu et al. (2016) highlighted the existence of several information asymmetries between the government (principal) and private investors (agents) during the implementation of PPPs that lead to suboptimal allocation of risk. Forsythe et al. (2015), examining a building information modelling (BIM) implementation project in the Australian construction industry, discovered that suppliers may take advantage of clients that are poorly informed about details of the project scope, for example, by including costly order changes and arguing that they are mandatory, even when their value for the client is questionable. Although a PBF may have information about the status of work progress (Sturts Dossick & Shunk, 2007), information about the possible problems and quality issues during execution of the subcontracted work may be exclusive to agents (Forsythe et al., 2015; Xiang et al., 2015). Agents may also choose not to disclose information about problems related to their work tasks (Forsythe et al., 2015; Liu et al., 2016), even though this information would support the principal in managing the project.

Only a handful of studies have scrutinized information asymmetries in the operations phase. The information that is exclusive to PBFs is often related to the history of the customer relationship and critical product knowledge (Finne & Holmström, 2013; Rabetino et al., 2015). For agents, exclusive information includes the location and condition of the installed base and individual customer preferences (Finne & Holmström, 2013) or novel combinations of data from production operations (Turunen et al., 2018).

5.3. Sharing of risks

Risk allocation is important in project organising as it strongly influences the motivation of both the principal and the agent (Atkinson et al., 2006). Furthermore, project actors perceive risks differently, and their approaches to managing risk differ as well. For example, an empirical study of information technology projects found that the perceptions of clients regarding the importance of individual risks differ, especially concerning risks originating from the opposite side of their agency relationship (Liu & Yuliani, 2016). Zwikael & Smyrk (2015) observed that in turbulent business environments, firms tend to utilise more flexible approaches to managing risk, placing more emphasis on

trust between project actors, whereas in more stable environments, they prefer a more rigid and control-oriented approaches to managing risk. In the front-end phase of projects, PBFs' risks are closely related to the possibility that an agent will perform poorly (Rapp, 2009; Zeng et al., 2015), act opportunistically or unethically (Matthyssens et al., 2003), or establish its own business and create offerings that compete with those of the principal (Wu et al., 2007). From the perspective of the agent, there may be a risk that the principal bypasses the agent by establishing its own business unit (Gadde, 2014) or taking control of the customer relationships initiated by the agent (Wu et al., 2007).

The previous literature has discussed several risks faced by principals and agents in the project implementation phase. PBFs may face risks related to the quality of the work carried out by their agents (Lee et al., 2009; Manu et al., 2015; Xiang et al., 2015) and the availability of subcontractors (Wang & Zhang, 2004). Subcontractors may also attempt to unilaterally increase the scope of the project to increase its profitability (Kadefors, 2004; Forsythe et al., 2015). From the perspective of agents, failing to meet the original project's requirements may cause delays in the schedule, resulting in possible financial sanctions (Sturts Dossick & Shunk, 2007; You et al., 2018). Moreover, Atkinson et al. (2006) discussed changes (made by the principal) in the design that can result in delays in the original schedule. Lastly, in the operations phase, PBFs' customer relationships may be harmed by dissatisfaction over the poor quality of the work performed by the agent working on behalf of the principal (Finne & Holmström, 2013). Furthermore, the PBF may become distanced from its customers (Helander & Möller, 2007) or overly dependent on specific agents (Jaakkola & Hakanen, 2013). Jaakkola & Hakanen (2013) also discussed the reputational risks in these settings, as a PBF's reputation is dependent on its agents' performance in the market.

5.4. Monitoring and control

PBFs rely on a rich variety of behavioural as well as output-based control mechanisms, which may be further characterised as formal and informal, to both motivate agents and avoid shirking and malfeasance on their part. Sales volume is a mechanism of output control over sales agents (Ojansivu & Alajoutsijärvi, 2015), whereas qualitative customer feedback collected by the PBF is a mechanism of behavioural control. In the front-end phase, the development of different plans (project, risk, quality, etc.) and procedures is a mechanism of behaviour-based control, which focuses on the process by which different project goals are achieved (Lin et al., 2019). However, formal control may give rise to additional risks, as attempting to exert rigid control over the agent may be detrimental to the business relationship between the principal and the agent (Merritt & Newell, 2001). Mechanisms of rigid control include barring the agent from simultaneously representing other principals (Bergen et al., 1992), profit- and risk-sharing arrangements (Müller & Turner, 2005; Schieg 2008; Wang & Liu, 2015), and requiring the agent to commit to investments specific to the principal-agent relationship (Bergen et al., 1992).

In the project implementation phase, the control mechanisms utilised tend to be characterised by more output-based measures (e.g., quality of the deliverable, meeting the expectations specified in the contract) (Badenfelt, 2010; Manu et al., 2015; Lin et al., 2019). Kadefors (2004) argued, however, that close monitoring of contractor performance and contractual incentives may induce opportunism in client-contractor relationships during the implementation phase of construction projects. Examining building outfitting projects in China, Ning (2017) found that access to project-related knowledge strengthened clients' (building occupants') readiness to adopt behaviour-based control mechanisms, whereas project-quality ambiguity prevented them from using outcome-based controls. The literature on project control has highlighted the importance of combining formal and informal control mechanisms to address the evolving nature of project environments in both the construction industry (Kivilä et al., 2017; Lin

et al., 2019) and the shipbuilding industry (Martinsuo & Ahola, 2010). To monitor and control agent performance during project implementation, a variety of control modes (behaviour, self-, and clan control) can be utilised, depending on the industry, task characteristics, and environmental uncertainties (Zwikael & Smyrk, 2015; Lin et al., 2019). Examples of specific mechanisms include subcontractor quality audits (Ahola et al., 2017), evaluation of delivered work (Badenfelt, 2010; Manu et al., 2015), and performance-based compensation (Chang, 2014). During the operations phase, agent behaviour and performance can be controlled using various output- and behaviour-based mechanisms (Robinson & Scott, 2009), such as contract and ownership arrangements and mapped processes (Jaakkola & Hakanen, 2013) or specified collaboration levels and investments in the agent training (Finne & Holmström, 2013; Jaakkola & Hakanen, 2013).

Based on the above analysis of project research through an agency theoretical lens, Table 1 summarises the identified characteristics of a PBFs upstream agency relationships. We may observe that agency relationships between the PBF and its sales agents during the project's front-end phase, on one hand, and relationships between the PBF and local service providers during the operations phase, on the other hand, share a high degree of similarity in terms of the goals of involved actors, the information available to them, and how risks are shared amongst the involved actors. In these cases, the involved actors emphasise the development of new business opportunities through the securing of project deliveries during the front-end phase and through service sales during the operations phase. In contrast to the PBFs' agency relationships with sales agents and local service providers, relationships with local subcontractors during project implementation seem to have a much stronger orientation towards efficiency than towards generation of new business opportunities. Indeed, cost optimisation rather than the interest in seeking technologically superior solutions often represents the PBF's underlying motivation for relying on local subcontractors.

6. Discussion

6.1. Agency relationships and their governance

Our analysis has implications for the literature discussing how PBFs manage their contractual relationships with external business actors. The need for aligning goals and value expectations among project stakeholders, including principals and agents, and the tendency toward their incongruence is already well understood in static, cross-sectional settings (Vuorinen & Martinsuo, 2019; Martinsuo et al., 2019). This study has drawn attention towards dynamic settings involving multiple simultaneous upstream agency relationships. The evolution and plurality of goals over the project life cycle creates complexity for the PBF not only because of the multiple simultaneously involved agents, each with their own specific goals. This complexity requires PBFs to manage their agency relationship portfolios strategically (Tikkanen et al., 2007; Mitrega & Pfajfar, 2015), and encourages PBFs to analyse agents' goals and expectations both on a strategic level and for each project separately.

To increase current understanding concerning the diversity of upstream agency relationships of project-based firms, as well as how agency relationships can be strategically managed, we present a typology of agency relationships (Fig. 3 below) which distinguishes upstream agency relationships based on two dimensions central in this study: goal congruence between the principal and the agent, and temporal orientation in the agency relationship. Goal congruence is particularly important as it relates to the extent to which the principal needs to utilize mechanisms that aim to reduce such behaviour from the part of the agent that conflicts with the goals of the principal (Müller & Turner, 2005; Liu & Yuliani, 2016). Temporal orientation of agency relationships interlinks with the inherent discontinuity of project-based organising (e.g., Arto & Kujala, 2008; Hadjikhani, 1996). In project business, it is typical that principal firms simultaneously have both agency

relationships that are established for the duration for a specific project delivery, as well as agency relationships that are not tied to any specific project. Distinguishing relationships along these key dimensions, our typology highlights four distinct types of upstream agency relationships: *routine*, *volatile*, *trustful*, as well as *strategic relationships*. We now proceed to discuss each type separately as well as implications of our study for their governance.

Routine agency relationships are characterized by short temporal orientation combined with low goal congruence between the principal and the agent. Typical examples of such relationships include subcontractors in close proximity to the customer's site that are employed for a specific, and often technically relatively simple task, such as groundworks for a building project, or assembling or manufacturing of simple mechanical components required for the project deliverable. Specialized expertise providers, such as designers or project management consultancies represent further examples of agents that frequently have relationships with their principal that can be categorized as routine according to our framework. Incongruence of goals is a significant issue in routine agency relationships. Subcontractors may be prone to seeking out opportunities for cost savings that may jeopardize the long-term functionality of the project outcome. Practical examples of such savings could include use of cheap but low-quality concrete, and air conditioning equipment with substandard bearings and/or electric motors that provide the specified air output, but only for a limited period of time. According to our analysis, selection of agents for routine agency relationships is likely to emphasize factors such as price, geographical proximity as well as availability of required resources (Tikkanen et al., 2007; Tarziján & Brahm, 2014; Manu et al., 2015). Governance mechanisms likely to be used for managing routine agency relationships include clear and explicit specifications of deliverables (Badenfelt, 2010; Manu et al., 2015; Lin et al., 2019), quality audits (Ruuska et al., 2009; Ahola et al., 2017), evaluation of delivered work (Badenfelt, 2010; Manu et al., 2015), and close monitoring of the agent (Kadefors, 2004; You et al., 2018). As an example, in a construction project involving a large laboratory building for a high-technology company in Sweden, Badenfelt (2010) discusses how the client set up a web camera that took a picture of the site three times a day to be able to conveniently track progress of the contractor's work.

Trustful agency relationships are characterized by short temporal orientation combined with high goal congruence between the principal and the agent. In these kinds of relationships, the involved parties are not committed to engaging in a business relationship that would extend beyond the duration of a single project, but at the same time the agent has high confidence in the ability and willingness of the agent to deliver what has been agreed. Agency relationships of this type can include, for example, relationships with globally established technology supplier firms and contract researchers. Regarding the former, technology firms, potentially world-leaders in their market segment, are typically highly competent in their area of specialization, have standardized project management practices in place, and have audited their manufacturing processes. Consequently, the risks faced by the principal when entering in a relatively simple market transaction with such a supplier are quite limited and the risk of the supplier behaving in an opportunistic manner are likely to be curbed by the agent's interest to maintain a reputation of a trustworthy business partner. Drawing on our analysis, governance of trustful agency relationships is typically rather straightforward. Selection of agents typically emphasizes reputation of the agent as well as experiences of potential previous transactions between the principal and the agent (Vásquez-Casielles et al., 2013; Cuevas et al., 2015). Simple and standardized contractual arrangements can often be used (Lin et al., 2019) and allocating a significant share of the principal's resources to auditing and monitoring the supplier are generally not considered warranted. Instead, Lin et al. (2019) discuss how in the context of the semiconductor industry, the client and the subcontractor developed a shared culture characterized by tacit understanding and mutual trust. This culture facilitated open communication regarding project progress

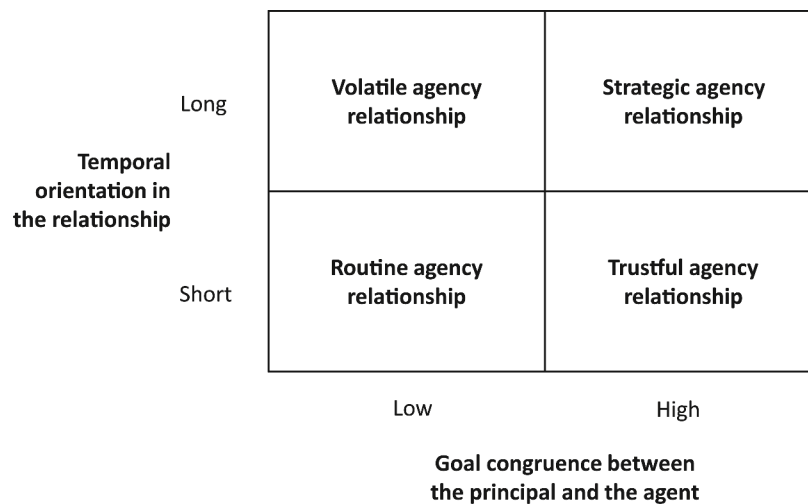


Fig. 3. A typology of upstream agency relationships of project-based firms

as well as challenges arising during the project. According to the authors, speaking out freely and openly sharing information across the principal-agent relationship provided the possibility for both actors to make timely decisions.

Volatile agency relationships are characterized by long temporal orientation combined with low goal congruence between the principal and the agent. These may include, for example, the PBFs' relationships with some of its sales agents and maintenance service providers. These kinds of actors are tightly coupled to the customer interface of the PBF as sales agents support the PBF in securing new delivery projects and maintenance service providers ensure that the customer can operate the project deliverable at its fullest potential. Service providers may also be able to access information regarding customer's value creation processes that is important from a marketing as well as research & development perspective (Cova et al., 2002; Tikkanen et al., 2007; Kujala et al., 2013; Vázquez-Casielles et al., 2013). While of strategic long-term importance, volatile agency relationships pose significant risks to the principal as well. For example, sales as well as service agents may serve multiple principals and possibly leak confidential information to support their idiosyncratic interests. Such confidential information may address, for example, pricing levels for project deliveries and service offerings. Due to this combination of high risk and high potential reward, governance of volatile agency relationships is inherently difficult. According to our analysis, placing an emphasis on the reputation, relational ties, as well as operational capabilities of the agent is particularly important here. Bergen et al. (1992) discuss how a manager selecting an agent may engage in multiple interviews, track down personal references, or administer a battery of aptitude tests in order to reduce the risks related to opportunistic behaviour in agent selection. Principals typically combine various formal as well as informal control mechanisms to monitor and control their agents. For example, agents may be formally barred from simultaneously representing principal's competitors (Bergen et al., 1992). Specifically, Anderson (1985) discusses how high performing sales agents are rare and are often locked to a specific principal, creating a barrier for entry for others as firms willing to enter the market may have to carry out sales activities in-house. In addition, agents may be compensated for each completed transaction (Cova et al., 2002; Müller & Turner, 2005), and various contractual gain and pain sharing arrangements may be utilised (Müller & Turner, 2005; Wang & Liu, 2015). In some cases, opportunism of agents may also be curbed by requiring them to commit to investments in developing expertise in selling principal's technologies & offerings (Anderson, 1985; Bergen et al., 1992).

Strategic agency relationships are characterized by long temporal orientation combined with high goal congruence between the principal

and the agent. Relationships of this kind are strategically important for the long-term success of the principal and often the agents as well (Xu et al. 2021). Examples of strategic agency relationships include subcontractor firms that are repeatedly used by the principal from a project to the next. Over time, the principal and the agent have developed a strong business relationship characterized by trust and mutual expectations of continuity. In addition, repeated transactions between the principal and the agent often allow the agent to learn to serve the principal more efficiently by acquiring information about the capabilities, processes and project management tools used by the principal (Eccles, 1982). In addition to subcontractors, a principal firm may form strategic agency relationships to sales agents and service provider firms that do not serve multiple competing principals, and thus have much lower incentives (and opportunities) to behave opportunistically as compared to what is the case in volatile agency relationships. Based on our review of existing literature, the formation of strategic agency relationships is a gradual process. This implies that some of the agency relationships that are trustful or volatile by their nature, may over time develop into strategic relationships in cases where the collaboration between the principal and agent creates mutual value and in which the principal is able to commit to using the agent over a long-term period instead of a single project. Mechanisms used for governing agency relationships emphasize mutual gains and development of the relationship, such as specified collaboration models with partnership levels (Finne & Holmström, 2013), development of shared values and norms that focus on mutual needs (Aulakh & Genturk, 2000; Liu et al., 2014), principal's investments in agent training (Jaakkola & Hakanen, 2013; Finne & Holmström, 2013). As an example of agent training, focusing on the offshore oil industry, Ahola et al. (2017) discuss how the principal that was responsible for delivering a technologically challenging, and first-of-its-kind, subsea power transformer solution, arranged free-of-charge welding training for its main subcontractors to ensure that they would be able to fulfil its strict quality requirements in welding a corrosion-resistant and extremely hard metal alloy specifically selected for the focal project. Finally, in order to increase transparency towards the agent's operations and goal alignment between the parties, the principal may in some cases also choose to acquire an equity share of the agent (Jaakkola & Hakanen, 2013).

Earlier research has highlighted that the emphasis of PBFs with respect to monitoring and control varies considerably across the project life cycle (Badenfelt, 2010; Toivonen & Toivonen, 2014; Lin et al., 2019). Relatedly, we found monitoring and control to vary by the type of the agency relationship as well. A further observation regarding the framework presented here relates to the dynamic nature of agency relationships. Based on our analysis a strategic agency relationship may

develop over time when the principal and agent are satisfied with the outcomes of their collaboration and are both willing to invest in developing their collaborative relationship. This highlights the dynamic nature of agency relationships and indicates that an agency relationship categorized as any of the four types in our model may over time change in terms of its temporal orientation or goal congruence between the principal and the agent. This also implies that agency relationships categorized as strategic may over time become volatile or trustful when the goal congruence decreases or the actors' motivation to commit to upholding the business relationship reduces. One key practical implication of our analysis is that the management of agency relationships over the project lifecycle should not follow a standardised template but should be based on the temporal orientation of the actors as well as their idiosyncratic goals.

6.2. Implications for the management of project-based firms

Adopting a life cycle perspective to PBFs' upstream agency relationships reveals that sales agents may play a central role during the front-end phase of the project life cycle and service partners are important actors during the operations phase. This complements the emphasis held in earlier systems integration literature towards technology suppliers, which have been posited as central actors for the design and implementation of system delivery projects (Finne et al., 2015). Indeed, by providing additional clarity towards the goals of the PBF as well as its agents across the entire solution lifecycle, this study contributes understanding on how different agents involved in delivery projects may benefit from their participation and how their interests relate to the interests of their principals.

The information asymmetry dimension in the developed analytical model connects to literature discussing information and knowledge sharing across the project lifecycle. This stream of research focuses, for example, on types and content of information PBFs may share with their partners (Yan & Dooley, 2013; Sun et al., 2015), benefits and disadvantages of information sharing (Boland et al., 2007; Gal et al., 2014), and reasons that either support or hinder the sharing of information (Bosch-Sijtsema & Postma, 2009; Solli-Sæther et al., 2015). Our findings suggest that during the front-end and operations phases, it is often a necessity for the PBF to share fine-grained information concerning its solutions and services in order for the agents to be able to carry out project marketing activities and provide value-adding services for the customers (Sia & Neo, 1996; Finne & Holmström, 2013). Sales agents, however, may also engage in multiple parallel principal-agent relationships – that is, simultaneously serve its principal's competitors (Bergen et al., 1992) – and by doing so develop valuable knowledge regarding customer buying preferences and market potential that is not shared with the PBF. In relationships between the PBF and its subcontractors during project implementation, information sharing is more limited and operational in nature, because to be able to perform, the subcontractor needs to know only the scope and schedule of subcontracted work. During project implementation, the subcontractor possesses detailed information regarding the progress of its work tasks, but if problems (e.g., quality problems) are encountered, it is uncertain if this information will be openly shared with the principal, as the subcontractor has little or no incentive to do so under a typical lump sum contract (Jørgensen et al., 2017). To conclude, based on our findings, information sharing in the agency relationships of a PBF appears much more open and richer in nature during the front-end and operations phases than it is during the implementation phase of the project life cycle.

This study has also implications for research on the management of risks in projects not only as external events for the PBF, but as inherent features of its agency relationships. Earlier research has established a connection between practices for risk management and project success (Bannerman, 2008; Thamhain, 2013; de Carvalho & Rabechini Junior, 2015; Pimchangthong & Boonjing, 2017). Therefore, an increased

understanding on the risks carried by both the PBF as well as its agents across the project lifecycle is likely to contribute towards increasingly effective risk management practices, such as contractual arrangements (Tang et al., 2020) and risk response strategies (Zhang, 2016). We reported that both the principal and the agents carry significant business risks across the entire project life cycle. From the perspective of the principal, the sales agents and local service providers may choose to favour its competitors (e.g., for higher commissions paid by a competitor), potentially undermining the PBF's project marketing efforts throughout the region in question. On the other hand, the principal may choose to utilise its agents as stepping stones to achieve a presence in the region and, after reaching a sustainable business volume, to bypass its agents by establishing its own local business units for project marketing and service provisioning (Olsson et al., 2013). Both the PBF and the local subcontractor typically carry significant risks (Zhang & Qian, 2017). The subcontractor risks facing contractual sanctions if its work is delayed or the principal does not accept the quality of the work (Xiang et al., 2015). From the perspective of the PBF, poor performance on the part of the local subcontractor may jeopardise the profitability of the entire project or, in extreme situations, even the future of the relationship with the PBF's customer. Thus, as risks vary considerably both between the PBF and its agents and across the project lifecycle, our findings strongly highlight the actor-specific nature of risk in projects. This resonates with recent studies on project risks (Willumsen et al., 2019; Bos-de Vos et al., 2019) that have argued that value creation and success in projects are affected by how different organisations involved subjectively perceive both risks and risk management practices. Our findings further imply that when carrying out risk identification activities, PBFs should make efforts to map out actor specific risks separately for each life cycle phase.

6.3. Limitations and avenues for further research

Although we have attempted to provide a somewhat comprehensive view of the upstream agency relationships of PBFs, this study suffers from a number of limitations. We acknowledge that not all relationships between the PBF and agents of a specific type (e.g., sales agents) are alike. For example, while many of the relationships with sales agents could be characterized as volatile or strategic, it is likely that not all agents fit this profile. For example, sales agents may represent the PBF in a narrowly defined technological area and be governed by a transactional, solely output-based contract. Further empirical research concentrating on the nature of agency relationships would allow us to uncover how well actual empirically observed relationships fit the ideal categorisations provided by our conceptual study. In addition, this empirical research could focus on the development of agency relationships over time; that is, how and why agency relationships move from one category to another.

One further aspect that is not covered here relates to the interdependencies between multiple concurrent agency relationships a PBF may engage in. Indeed, while focusing on the nature of individual relationships as well as how they can be governed, we have not directed attention towards how multiple concurrent agency relationships may interact with each other. It is widely known that the design and implementation of major projects tends to involve inter-organisational networks consisting of dozens if not hundreds of firms, connected by different kinds of agency relationships. In addition to directing their attention towards individual relationships, PBFs also need to manage their relationships at a wider level of the entire project network. The emerging literature on project governance has shown that projects may have project-specific governance structures that support the alignment of actor goals, monitoring of progress, and resolution of conflicts (Kujala et al., 2020). For example, in alliance projects, a central challenge is not to align the interests of the principal and a single agent, but to align the interests of multiple principals (the core team of the project alliance) (Ahola, 2018) and the broad network of various suppliers and subcontractors that have agency relationships to members of the core

team. Indeed, additional conceptual as well as empirical research is required to understand the management of multiple interdependent agency relationships in the context of project organising. Finally, our study did not address the issue of relationship dynamism; that is, the question of how the relationship between a principal and a specific agent may evolve over time. Deliveries in a project context may span months or even years, and consequently many agency relationships may be long in their duration as well. Given the inherent uncertainty of project business it is likely that management of at least some of the agency relationships of a PBF may need to be continuously adjusted based on a variety of factors including agent performance, agent's commitment to continuing the relationship as well as the technical progress of the project. This dynamism implies that an agency relationship that we could accurately characterize as routine at the start of a project may, as the project progresses, become trustful or volatile, depending on how the complex processes of interaction between the principal and agent, as well as other actors involved in the project.

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