BEING BOTH: GOVERNANCE AND UNCERTAINTY IN THE TEMPORARY PROJECT ORGANIZATION

Rachel Pacheco, PhD
Lecturer
The Wharton School, University of Pennsylvania

Abstract

In this paper, I examine the impact of uncertainty and governance on the performance of temporary project organizations. Using a sample of 2319 temporary project organizations comprised of 45,883 firms operating across 135 countries, I find that under conditions of high environmental uncertainty—that is, the difficultly in predicting changes in the external environment—hierarchy benefits the performance of the project organization. In the case of behavioral uncertainty—the difficulty in predicting the actions of relevant partners—more hierarchy hurts the performance of the temporary project organization, depending on the type of project that is being undertaken. I posit that more hierarchy can harm critical trust-building processes within projects in the infrastructure space. This research contributes to the understanding of temporary project organizations that exhibit both hierarchical and market-like governance; and provides empirical evidence for the performance implications of the potential misalignment of form and the uncertainty that these organizations face.

The temporary project organization—a group of firms that comes together to execute a common goal, such as the building of a bridge or the production of a movie, then disbands at the goal's completion—does not fit into the neat governance continuum that scholars have long used in examining organizations (Eccles, 1981). The temporary project organization utilizes elements of both market-based and hierarchical governance to ensure coordination and alignment across its multiple members, build trust, and enable the flexibility required in a context with competing goals and shifting timelines. Past work on how uncertainty drives governance choice (e.g., Santoro & McGill, 2005), and how the alignment of governance choice impacts performance (e.g., Sampson, 2004) overlooks the plural form of governance found in the temporary project organization where both elements of market and hierarchy are present. I heed the call to examine governance theories across formal-informal organization and extend our empirical understanding of the governance choice—performance link (Cuypers, Hennart, Silverman, & Ertug, 2021) to attempt to understand how the alignment between governance choice and the magnitude and type of uncertainty impacts the performance—as measured by whether the project organization successfully accomplished its objectives set out at the beginning of the project—of the temporary project organization.

As transaction cost theory highlights, in seeking to minimize transaction costs (e.g., fixed costs of contracting, which may be spread out over multiple transactions, or risk of ex post hold up) while minimizing the risks of a transaction (e.g., risk of opportunism or partner hold-up), an organization may choose to operate in as a hierarchy (e.g., vertically integrate) or use a market-based, arm-length's relationship to transact (Williamson, 1975). Uncertainty—along with asset specificity and transaction frequency—is one of the three primary attributes on which an organization bases this choice of governance (Lawrence & Lorsch, 1967; Gulati & Singh, 1998; Sutcliffe & Zaheer, 1998). Uncertainty is broadly categorized as either environmental—the difficulty in predicting changes and volatility in the external environment—or behavioral—the unpredictability of a relevant partner's actions with regards to the potential for opportunistic behavior from those partners (Williamson, 1985). Environmental

uncertainty increases the need to adapt to rapidly changing conditions and to collect new information, and it also increases the potential for partners to find reason to act opportunistically (Cuypers, et al 2021). For example, under conditions of technological unpredictability, a firm may choose less hierarchical governance to allow for more flexibility to adapt (Balakrishnan & Wernerfelt, 1986; Folta, 1998). Behavioral uncertainty increases the need for trust between partners, as well as to control and constrain partners, and effectively gather information to monitor partner behavior. For example, when partners have little experience working together, there may be a greater need for the control afforded by hierarchical governance (Santoro & McGill, 2005). Yet, despite a long and rich set of studies exploring how uncertainty affects governance choice, outcomes remain empirically ambiguous: Behavioral and environmental uncertainty have been shown to increase the likelihood of hierarchy, decrease the likelihood, and also have no effect (Santoro & McGill, 2005; David & Han, 2004; Macher & Richman, 2008).

Both environmental and behavioral uncertainty are particularly pronounced in the temporary project organization, also known as the interorganizational project (Bakker, 2010), ephemeral organization (Lanzerra, 1983), quasi-firm (Eccles, 1981), and transitory organization (Palisi, 1970), among other names. The temporary project organization is "inextricably interwoven" (Grabher, 2004:1492) with the environmental context in which it operates, and the success of the organization is driven by its ability to navigate an often unfamiliar and volatile institutional context (Ligthart, Oerlemans & Noorderhaven, 2016; Henisz, 2003; Fligstein & McAdam, 2011). Furthermore, the temporary project organization is comprised of numerous partners with differing goals, objectives, and levels of experience working together, and as such, the organization's success depends on its ability to establish norms of behavior, coordinate and communicate with partners, and manage the uncertainty from these complex partner relationships despite the absence of a unitary corporate actor (Eccles, 1981; Bechky, 2006; Sydow & Braun, 2018).

The temporary project organization exists has its own type of governance (Eccles, 1981). The classic view in organizing is that firms utilize governance along the hierarchy to market continuum to

allocate and control resources (Arrow 1974, Coase, 1937; Williamson 1975, 1985).[1] Yet, the temporary project organization, among other "second order" organizational forms (Borys & Jemison, 1989), exhibits plural governance: the temporary project organization relies on hierarchical control and coordination, market-based interactions, and additional elements such as social capital, relational governance, and other trust-based mechanisms to collaborate, and ultimately be successful (Eccles, 1981; Bechky, 2006; Sydow & Braun, 2018). Though it is generally accepted that hierarchy and market-like elements can exist "in tandem" in the temporary project organization (Young, 1989: 188), some temporary project organizations rely on greater hierarchy, with a single firm or few firms controlling most of the project resources (often referred to as a "strong owner" structure (Winch & Leiringer, 2016). This "strong owner" structure is aligned with the "order view" of the temporary project organization that posits that greater hierarchy helps with the coordination of multiple players and efficient resolution of decisions within the project (Van Marrewijk, Ybema, Smits, Clegg & Pitsis, 2016). Whereas other project organizations have a more equitable distribution of resources that more closely mimic market-based governance, a structure aligned with the "conflict view" of the project organization which posits that hierarchy can instigate conflict and competition, as project members vie for limited resources, and push against the partners in control (Van Marrewijk, et al 2016). Thus, there may not only be limits to fiat, but also negative consequences resulting from greater hierarchy.

Transaction cost theory presumes that organizations with aligned governance—i.e., governance type as dictated by uncertainty, asset specificity, and frequency—will have superior performance than those organizations with misaligned governance (Williamson, 1985). Thus, building on past work examining the impact of behavioral and environmental uncertainty on governance choice (e.g., Santoro &

[1] It should be noted that scholars have long acknowledged that mechanisms along the hierarchy – market continuum (e.g., licensing, joint-ventures) allow firms to navigate contexts where a pure hierarchy or pure market is not sufficient; and scholars have long-held the view that the market-hierarchy choice is not black or white. Certain markets may contain hierarchical elements and vice versa – hierarchies may contain market-like mechanisms when allocating resources (Corey 1976, 1978; Eccles 1981; Jackson 1985; Macaulay 1963; Stinchcombe and Heimer 1985; Hennart 1977, 1982). Further shades of grey occur when some market-based transactions *within* a firm are preferable to its internal hierarchy, as transfer prices within divisions of a firm may generate more conflict and more transaction costs than a market-based transaction (Eccles & White 1981).

McGill, 2005), and on the plural governance of the temporary project organization (Eccles, 1981), I investigate: under what types of uncertainty does greater hierarchy versus greater market governance benefit the performance of the temporary project organization? I build on past research that seeks to predict, *ex-ante*, governance choice based on uncertainty type (e.g. Balakrishnan & Wernerfelt, 1986; Folta, 1998; Geyskens, Steenkamp & Kumar, 2006), by exploring the interplay between uncertainty and governance choice in the *performance* of the temporary project organization. I build on the work of past scholars such as Brouthers, et al (2003), Sampson, (2003, 2004), Nickerson & Silverman (2003), Anderson, Dekker & Van den Abbeele (2017), and Forbes & Lederman (2010) that looks at the cost of misalignment of a binary governance choice, and extend this work by accounting for the plural governance of the temporary project organization: I measure governance along a continuum, with some temporary project organizations exhibiting "greater hierarchy"—resources are controlled by a small group—and others exhibiting "greater market-like" governance—resources are more equitably distributed—while acknowledging that other forms of governance remain present despite a dominant form.

Using a research context of 2319 temporary project organizations comprised of 45,883 partners operating in 135 countries from 1999 to 2016, I predict that greater hierarchy helps the performance of the temporary project organization under conditions of high environmental uncertainty. I look at performance as whether the project organization successfully accomplished its objectives set out at the beginning of the project. I look at the environmental uncertainty resulting from unknown institutional contexts (such as an unfamiliar regulatory regime), and theorize that more hierarchical governance allows the organization to better manage relationships with external stakeholders, especially in those environments where external stakeholders pose a threat to the organization's operations; and to more easily collect, absorb, and share the knowledge that is required to navigate the unknown local context (Delios & Henisz, 2000; Luo, 2001; Xu & Shenkar, 2002). I posit that greater hierarchy helps only when the firm at the top of the hierarchy has knowledge of this local context, and as such, can share relevant information and knowledge to other partners in order to navigate the uncertain context.

I also predict that under conditions of behavioral uncertainty, the relationship between hierarchical governance and performance depends on the *type* of project, as some projects require more control and partner monitoring (Ulset, 1996; Eramilli & Rao, 1993). I theorize that for projects where key performance indicators are often set at the outset of the project and industry-wide norms help dictate behavior, hierarchical governance harms performance under conditions of behavioral uncertainty. For these temporary project organizations, greater hierarchy may impede the trust-building required for navigating new partners (Lumineau & Malhotra, 2011; Krishnan, Martin & Noorderhaven, 2006), and generate conflict and competition between partners (Van Marrewijk, et al 2016), ultimately harming performance.

This study heeds the call to both push the bounds of transaction cost theory to better understand hybrid organizational forms (Eccles, 1981; Bakker, DeFillippi, Schwab & Sydow, 2016); and to better understand the link between governance choice and performance, especially performance that goes beyond profitability (Cuypers, et al 2021). Furthermore, despite its importance and prevalence across many industries, the governance of the temporary project organization is not well-explored in the management literature (with the notable exceptions of Bechky (2006), Majchrzak, Jarvenpaa, & Hollingshead (2007), and Schwab & Miner (2008)). This study builds on this limited but rich work to shed further light on what factors drive success in the temporary project organization and provides a unique contribution on the interplay between uncertainty, governance and performance in these hybrid forms. In the closing of this paper, I will elaborate on these specific contributions and avenues for future research on this topic.

THEORY & HYPOTHESES

The temporary project organization can be defined "as a set of organizational actors working together on a complex task over a limited period of time" (Bakker 2010:468). The temporary project organization acts like a singular firm in many ways while in operation, but differs from a unitary firm in ways that matter for governance, communication, coordination, and incentives, among

other critical aspects. Thus, temporary project organizations have been called quasi-firms (Eccles, 1981), temporary systems (Meyerson, Weick & Kramer, 1996), synthetic organizations (Thompson, 1967), ephemeral organizations (Lanzerra, 1983); project-based enterprises (DeFillippi & Arthur, 1998), interorganizational project networks (Oliveira & Lumineau, 2017), and single-project organizations (Faulkner & Anderson, 1987; Baker & Faulkner, 1991), among other terms, in order to describe how these organizations exist and their impermanence. Despite increasing prevalence of this organizational form across a number of industries including biotech (Hoang & Rothaermel, 2005) construction (Eccles, 1981; Swärd, 2016), film-making (Bechky 2006), emergency response (Majchrzak, Jarvenpaa, & Hollingshead, 2007), and finance (Dorobantu, Lindner & Müllner, 2019), limited recent research, especially quantitative research, exists in the strategy and management field on the governance of temporary project organizations.[2] Despite these limitations, there is consensus across fields about the managerial challenge of temporary project organizations: These organizational forms are complex, critical, difficult to manage and often result in underperformance and outright failure (Flyvbjerg, Bruzelius & Rothengatter, 2003; Scott et al., 2011).

The temporary project organization differs from other types of interorganizational relationships—such as the relationship between a supplier and buyer, between alliance partners, or between members of a joint-venture—in critical ways (Bakker, et al 2016).[3] First, the temporary project organization is time-bound: unlike a permanent organizational form, the temporary project organization has an *ex-ante* expectation of termination (Lundin & Söderholm, 1995). As such, the ability of partners to have repeated interactions may be limited; and there may be greater likelihood for opportunism given the terminality of the project (Swärd, 2016). Furthermore, the temporary project organization relies on interdependence of

[2] There is a rich and extensive body of research of this organizational form in the project management and construction fields (see Sydow & Braun, 2017; Bakker, 2010 for reviews)

[3] In the project management literature, the temporary project organization is distinguished from other organizational forms by four characteristics—time, team, task, and context (Bakker, 2010). These characteristics—describe how temporary project organizations differ from other permanent organizational forms and have long provided the theoretical foundation from which project organization research builds on (Lundin & Söderholm, 1995; Sydow & Braun, 2018).

partners working together to achieve the project objective, with partners representing their permanent organizations' cultures, expectations and goals. Despite this interdependence and need for close coordination, the partners working together often do not have formal contracts with each other.

Given these unique characteristics, the temporary project organization does not neatly fit into the transaction-cost continuum but rather exhibits plural governance. The temporary project organization lacks a formal hierarchy and a unifying center of control but relies on informal hierarchy as well as market-like governance, and on informal relationships, trust building, and social capital to be successful (Eccles, 1981; Clegg, Pitsis, Rura-Polley & Marosszeky, 2002; Bechky, 2006; Scott, Levitt & Orr, 2011; Sydow & Braun, 2018;). Though multiple types of governance exist "in tandem" in the temporary project organization (Young, 1989: 188), there remains an open question as to the *extent* of hierarchy that is beneficial for the temporary project organization. The "order view" of the organization emphasizes that more hierarchy helps with the coordination of multiple players and efficient resolution of decisions within the project (Van Marrewijk, Ybema, Smits, Clegg & Pitsis, 2016). As such, some temporary project organizations operate with a "strong owner," a firm or firms that control the majority of the project resources (Winch & Leiringer, 2016). Yet, in the "conflict view" of the organization, hierarchy can instigate conflict and competition, as project members vie for limited resources, and push against the partners in control (Van Marrewijk, et al 2016). Thus, there may not only be limits to fiat, and but also negative consequences resulting from hierarchy. This conflict-view is aligned to social dominance theory, which posits that unequal allocation of resources within groups harms trust, increases conflict, and impedes communication (Sidanius & Pratto 2004). The temporary project organization relies heavily on social capital and trust to be successful, which may be jeopardized by this conflict and competition. I acknowledge that past views of the temporary project organization develop an incomplete picture of what may drive the temporary project organization from leaning on more hierarchical governance versus more market-like governance. Aligning with transaction cost research, I do not try to prove if one type is better than the other, but rather, I examine the contingent effects of uncertainty on governance in the temporary

project organization: Under what type and magnitude of uncertainty does the project organization benefit from more hierarchy or more market-like governance?

Uncertainty and Governance

Thompson (1967:159) states that "uncertainty appears as the fundamental problem for complex organizations," and interorganizational relationships often fail as a result of the challenges posed by uncertainty (Krishnan, Geyskens & Steenkamp, 2016). Uncertainty drives decisions about governance choice, as organizations attempt to minimize the problems of transaction costs and opportunism that arise because of it (Williamson, 1985). Using the transaction cost lens, scholars have long explored how types of uncertainty drive governance decisions (e.g., Santoro & McGill, 2005), the interplay of uncertainty and asset specificity (e.g., Weber & Mayer, 2014), how uncertainty and trust interact (e.g., Krishnan, Martin & Noorderhaven, 2006), and how uncertainty impacts acquisitions and divestitures (e.g., Bergh & Lawless, 1998). Despite its extensive study, the effect of uncertainty on governance choice is mixed (see Krishnan, et al (2016) for a review of this literature).

Uncertainty is broadly categorized as either environmental or behavioral (Williamson, 1985). Environmental uncertainty, also referred to as primary uncertainty (Sutcliffe & Zaheer 1998), is the difficultly in predicting changes and volatility in the external environment. Behavioral uncertainty, or secondary uncertainty, is the unpredictability of a relevant partner's actions with regards to the potential for opportunistic behavior from those partners (Williamson, 1985).

I start by examining environmental uncertainty. Environmental uncertainty can result from regulatory changes or government intervention (Sutclifee & Zaheer, 1998; Henisz & Delios, 2004); technological changes in the industry (Mitchell, 1988); or changes to the product market (Wholey & Brittain, 1989). Environmental uncertainty reflects a lack of knowledge or understanding about the "states of nature" (Sutcliffe & Zaheer, 1998), and as such, Williamson (1985:57) calls this uncertainty "innocent" as it is outside of the sphere of the organization. However, the organization is not fully without agency to manage environmental uncertainty. Environmental uncertainty is further classified as

endogenous—the uncertainty can be reduced by the actions of the firm, and exogeneous—the uncertainty is not affected by actions of the firm and is resolved over time (Folta, 2003).

For the temporary project organization, environmental uncertainty is particular salient: the temporary project organization is "inextricably interwoven" (Grabher, 2004:1492) with the environmental context in which it operates, and the success of the organization is driven by its ability to navigate an often unfamiliar and volatile institutional context (Ligthart, et al 2016; Henisz, 2003; Fligstein & McAdam, 2011). It should be noted that different types of environmental uncertainty can elicit opposite organizational outcomes and behaviors. Given the purpose of the temporary project organization to execute on a pre-determined task and disband once that task is over, I focus on the risk of environmental uncertainty that results from unpredictable regulatory changes, an uncertain institutional context, or responses by local stakeholders as opposed to the risk of a change in the competitive landscape or technology (Orr & Scott, 2008).[4]

Temporary project organizations facing environmental uncertainty contend with two critical dimensions: 1) the ability to manage external stakeholders, especially in those environments where external stakeholders pose a threat to the organization's operations; and 2) the collection, absorption and sharing of the knowledge and capabilities required to navigate the unknown local context (Luo, 2001; Xu & Shenkar, 2002).[5]

The first dimension that an organization must contend with under conditions of high environmental uncertainty is the ability to manage external stakeholders, especially in those environments where external stakeholders pose a considerable risk (see Henisz, 2016). For example, the temporary

[4] For example, volatility in a product market, or rapid shifts in technology in the industry, require an organization to pivot, make discretionary investments, and in general, not be constrained to respond to the competition at hand (Kogut, 1991; Folta, 1998). When accounting for the need for flexibility, environmental uncertainty predicts a less hierarchical governance form for the organization (Santoro & McGill, 2005, Balakrishnan & Wernerfelt, 1986; Folta, 1998).

[5] Past scholars have explored environmental uncertainty in areas of poor regulatory quality or weak institutions (Krishnan, et al 2016). However, aligning with substantive and long-standing scholarship in the international business field and as summarized in the transaction cost lens (Cuypers, et al 2021); poor regulatory or institutional quality may not be a disadvantage for an organization if the organization itself is from a similar home country context. Thus, in measuring environmental uncertainty, I look at relative distance of institutional values, as opposed to absolute institutional quality when measuring uncertainty.

project organization that comes together to build a mine must negotiate with multiple political actors, secure permits, liaise with the local community and manage the risk of expropriation or reallocation of funds by the government. The project organization that comes together in response to a health crisis (e.g., Majchrzak et al, 2007) must work with local community leaders, health centers, and government bodies, while navigating the healthcare regulatory environment in which it operates. Building on a rich set of studies in international development and other fields (e.g., Arnstein 1969; Choguill, 1996), management researchers have begun to investigate not only why effective coordination with and acceptance by external parties is important for an organization, but also how it can be achieved (see Clegg, et al, 2002; Henisz, Dorobantu & Nartey, 2013). Many of these strategies focus on creating shared values, objectives, and a sense of social closeness and cohesion between the external stakeholders and the organization. Shared values, norms, and operating expectations with external stakeholders can increase trust and ease communication between groups, resulting in reduced conflict and more successful outcomes.

Second, environmental uncertainty requires an organization to process new information about the environment, especially when there is a lack of familiarity in the way of operating in an unknown context. Organizations in uncertain contexts contend with unfamiliarity hazards and information asymmetries, which increase the amount of resources the organization must expend in order to navigate the environment (Mahoney, 1992; Meyer, 2001; Tong, Reur & Peng, 2008). In particular, organizations must overcome a "liability of foreignness" that results from a lack of knowledge of the local context and way of doing business in this context (Zaheer, 1995). Furthermore, knowledge gathering can be problematic in ambiguous environments (Haas, 2006b); and high environmental uncertainty can bring about a significant information overload, as an organization attempts to absorb and synthesize input from the environment and determines how to respond to that information (Krishnan, et al 2016).

Thus, environmental uncertainty requires the temporary project organization to process new information about the environment and share that information across the organization in a timely manner in order to make decisions about how to respond to the unknown and unpredictable context (Huber, Miller & Glick, 1990). It requires the partners of the temporary project organization to coordinate and

share knowledge and determine how to respond to external stakeholders. Addressing this potential for coordination failures and communication challenges across partners becomes even more important in the context of the temporary project organization, as an increase in number of partners increases the difficulties of coordination and the likelihood of conflict (Lavie, Lechner, & Singh, 2007).

In line with past scholars exploring more traditional governance forms (John & Weitz, 1988), greater hierarchy in the temporary project organization helps address environmental uncertainty in two primary ways: it supports coordination and information sharing amongst partners; and it allows the temporary project organization to quickly respond to decisions and resolve potential disputes that arise when navigating external stakeholders. As previously discussed, hierarchy enables communication and provides a sense of structure and predictability in a group (Kiesler, 1983; Tiedens & Fragale, 2003). As extolled by the "order view" of the project organization (Van Marrewijk, et al 2016), hierarchy allows the partner or partners with control to make clear (and enforce) expectations and a way of operating (Das & Teng 1998, 2001; Bunderson & Boumgarden, 2010; Bunderson & Reagans 2010). As such, a clear set of expectations and a macro-culture allows for ease of coordination and communication across partners (Jones, Hesterly, & Borgatti, 1997).

Conflict may arise as partners seek to determine the best course of action for addressing external stakeholders and determining how to operate and react in an uncertain environment. Furthermore, as previously discussed in the "conflict view" of the organization, greater hierarchy may exacerbate these conflicts as partners compete for resources and push against the partners in power. However, disputes can be resolved more quickly given that a central entity that can manage all parties' interests and make decisions by fiat (Williamson 1975). When a partner holds a concentration of resources, it can more easily act at will, and is better at ignoring irrelevant information (Guinote, 2007). Thus, in managing the conflict that results from needing to determine the best course of action in an uncertain environment, hierarchy allows the dominant partner to operate with fewer constraints, resulting in quicker decisions and more cost-effective resolution of conflict (Lumineau & Malhotra, 2014). For example, Forbes & Lederman (2010) found that on days of high environmental uncertainty (adverse weather conditions),

airlines benefited from hierarchical governance, as it allowed them to make real-time, non-contracted decisions to adapt to the situation at hand.

Greater hierarchy allows for the "strong owner" in the temporary project organization to act with fewer constraints, make efficient decisions (Winch & Leiringer, 2016), and establish a macro-culture and "common dominant frame" (Weber & Mayer, 2014). In situations of high environmental uncertainty, this greater hierarchy enables the temporary project organization to coordinate external stakeholders and efficiently gather and share information about the uncertain environmental context. The presence of a central actor who can effectively win the hearts and minds of stakeholders (a "corporate diplomat") within the local environment is seen to be important for managing stakeholder relationships and operating in an uncertain context (Henisz, 2016). Yet, the central actor at the top of the hierarchy in the temporary project organization runs the risk of imposing the wrong set of operating norms or behaviors that conflict with the operating norms of the stakeholders of the external environment. Furthermore, as a strong owner may ignore information it deems irrelevant (Guinote, 2007) or fail to take the perspective of the other partners (Galinsky, Magee, Inesi & Gruenfeld, 2006) and as such, there is a risk that the firm does not absorb or share the right type of information with its partners. It matters what information is shared and what norms are established in order to address environmental uncertainty. Therefore, I predict that greater hierarchy helps the performance of the temporary project organization under of high environmental uncertainty, but only when the partner at the top of the hierarchy has knowledge about the local context.

Hypothesis 1: *Under conditions of high environmental uncertainty, greater hierarchy helps the performance of the temporary project organization, but only when the lead partner has knowledge of the local context.*

The second type of uncertainty, behavioral uncertainty, pertains to anticipating and understanding how partners will act in an exchange (Krishnan, Martin, & Noordehaven, 2006). Under conditions of high behavioral uncertainty, which is also called secondary uncertainty, an organization lacks knowledge about its partners and has difficult predicting their actions (Sutcliffe & Zaheer, 1998). Thus, under conditions

of behavioral uncertainty, an organization works to manage the risk of partners disguising or distorting information or behaving in an opportunistic way (Williamson, 1985). Because monitoring and evaluating partner behavior is needed to manage behavioral uncertainty, behavioral uncertainty is often high in R&D-intensive industries because of the difficulty in evaluating intellectual activities (Ulset, 1996); in service industries because of the lack of separation between production and consumption (Eramilli & Rao, 1993); and when partners' tasks are highly interdependent or the partners are also competitors (Khanna et al., 1998; Oxley & Sampson, 2004). In particular, I examine behavioral uncertainty that results from the unpredictability of a partner's actions (as opposed to, for example, task uncertainty or strategic uncertainty, which refer to the activities performed within a partnership) (Casciaro, 2003).

The temporary project organization contends with inherent behavioral uncertainty: because partners disband at the end of the project, partners may have a limited "shadow of the future" – the likelihood that they will work together again, an important phenomenon for limiting opportunistic behavior (Heide & Miner, 1992; Lighthart, et al 2016). Furthermore, partners in the temporary project organization often do not have contracts with each other (but rather with a central body); therefore, the opportunity for partner uncertainty is high as there are limited formal mechanisms for control or coordination amongst partners. Additionally, the temporary project organization contends with numerous partners from different industries, home country backgrounds, and levels of experience working together. These differences impact behavioral uncertainty, as differences, for examples, distance between cultural attributes, make it harder to understand and predict partner behavior (Anderson & Gatignon, 1986; Maseland, Dow, & Steel, 2018). I examine the partner uncertainty that results from having limited experience working with the other partners on the temporary project organization. As partners gain experience working together, they begin to better understand and predict partner behavior and partner uncertainty decreases (Santoro & McGill, 2005).

The impact of hierarchical governance on performance under conditions of high behavioral uncertainty is not straightforward and past empirical studies highlight this lack of consensus (David &

Han, 2004). On one hand, under high behavioral uncertainty, hierarchical governance helps control and constrain partner behavior, thus limiting the potential for opportunistic actions from partners (Santoro & McGill, 2005). On the other hand, hierarchical governance may harm the potential for unknown partners to build trust with each other, an important mechanism for ensuring that partners will not act in a way that is harmful to each other (McEvily, Perrone, & Zaheer, 2003).

More hierarchical governance can help manage behavioral uncertainty in the temporary project organization because it allows for the establishment of a dominant set of operating norms, structure, and predictability that can control partner behavior (Kiesler, 1983; Tiedens & Fragale, 2003). When an individual or group has dominance over others, they can influence (whether directly or indirectly) the overall behavior of the group by making more explicit norms and expectations of operating (Das & Teng 1998, 2001; Bunderson & Boumgarden, 2010; Bunderson & Reagans 2010). These informal control mechanisms constrain behavior, as partners work within a set of operating parameters and deviance from these sets of established behaviors is easily visible. As such, hierarchy can mitigate schisms amongst partners, as the central partner can impose (and enforce) a clear set of objectives and expectations from which the group is expected to follow (Heidl, Steensma & Phelps, 2014; Lumineau & Malhotra, 2011).

Yet, hierarchy can also harm the trust-building required to manage partner uncertainty. Hierarchy can instigate conflict and competition as project members vie for limited resources, and push against the partners in control (Van Marrewijk, et al 2016). Control can reduce trust (Lumineau & Malhotra, 2011), and harm communication flows (Sidanius & Pratto, 2004). Conversely, trust reduces the need for costly monitoring of partners (Santoro & McGill, 2005); and encourages partners to assume each other's behaviors are not meant to be detrimental to the group (McEvily, et al 2003). Trust allows for easier sharing of information amongst each other (Dyer & Chu, 2003) and allows the partners to focus on improving performance of the project as opposed to monitoring each other's behavior to thwart malfeasance (McEvily, et al 2003). In fact, some scholars argue that in the face of high behavioral uncertainty, organizations should focus on building trust amongst partners, as more formal structures are not effective, and at times, detrimental to the partnership (Krishnan, et al 2016).

Behavioral uncertainty, and how to manage it, varies based on the nature of the work undertaken by the partnership (i.e., the attributes of the partnership). In certain sectors, monitoring partner behavior is more difficult given the type of work. For example, in the R&D sector, intellectual activity of partners is difficult to monitor (Ulset, 1996). It may be easier for partners to distort or disguise information given the ambiguous nature of that information. Projects that involve clearly defined tasks and have limited room or need for creativity, partners may find it easier to monitor partners and access information about partner behavior. For example, projects in the infrastructure sector have clearly defined key performance indicators, with the most common milestones being on-time and on-budget (Toor & Ogunlana, 2010). Progress is visible (e.g., was the foundation laid, were the parts delivered) so it is more challenging for partners to hide or make ambiguous information about their behaviors. And, industry norms and regulations provide additional mechanisms for control and coordination of partner activity (Swärd, 2016). Furthermore, in these projects, overall success is dependent on the partners being able to quickly build collaborative commitment, transparency, and a strong project culture (Clegg, et al 2002), and the presence of trust has been found to be a major driver of the total cost of the projects in the infrastructure space (Zaghoul & Hartman, 2003). Thus, in projects where control is accomplished through established key performance indicators and external regulations, and the ability of the partners to quickly build trust is paramount to success, I predict greater hierarchy harms the performance of the temporary project organization under condition of high behavioral uncertainty, as hierarchy harms the ability of the organization to build trust amongst partners, and creates competition and unproductive conflict (Van Marrewijk, et al, 2016).

Hypothesis 2: *At high levels of behavioral uncertainty, greater hierarchy negatively affects the performance of the temporary project organization for those projects that have industry-wide norms and key performance indicators.*

METHODS & SETTING

The setting for this study is the set of all World Bank-funded projects that began and ended between 1999 and 2016. The World Bank provides funding, in the form of long-term concessionary loans to countries for projects that will impact the economic and social development of a particular country or region. The Bank supports in the identification, preparation, monitoring, and evaluation of these projects in collaboration with the host countries.[6] Private companies, individuals, and NGOs are contracted to each project by the borrowing country sponsor and comprise the temporary project organization that executes the project. The partners that comprise the projects are selected through a variety of procurement methods (e.g., international competitive bidding, national competitive bidding, etc.).

This setting is attractive for many reasons. The primary reason is that these temporary project organizations do not appear to be fundamentally different from other large global projects not funded by the World Bank. Often, these World Bank-funded projects are partially funded by other private or multilateral sources. Multiple funding sources are common on large global projects, including funding from a mix of public and private sources. Second, the projects of this dataset span countries and industries, providing a rich variance of environmental contexts. Further, the companies executing these projects span a variety of home countries, levels of prior experience, and experience with local partners, as discussed below. These companies also execute on temporary project organizations not funded by the World Bank. Finally, while there is a great deal of research exploring drivers of project outcomes using the World Bank Project Database and IEG Performance Database (see Dollar & Levin, 2005; Isham & Kaufmann 1999; Kilby, 2000) there has been little consideration of the firm-level effects on project-level outcomes (with the notable exceptions of Malik & Stone (2017) and McLean (2017)). Thus, this research fills an empirical gap in the international aid and development literature by extending the existing analyses to include the effect of the contractors who execute these large-scale development projects.

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[6] The World Bank refers to host countries as "borrowing countries," but for the purposes of this study I follow nomenclature used in international business research and refer to the country where the project takes place as the "host country."

The datasource is comprised of three existing datasets: the World Bank Project Database, the World Bank Contractor Database and the IEG Performance Database. The data are organized with one observation for each new contracting relationship (i.e., firm, individual or NGO) entered to support a World Bank project. In all, there were 157,180 contracting relationships introduced between 1999 and 2016 across 5864 projects (the Contractor Database started collecting data in 1999). From this dataset, I combined contract observations (and summed contract amounts) to ensure that for each unique project there were not multiple observations with the same partner, resulting in a dataset of 102,203 contracting relationships. Given that the theoretical test of these data is of hierarchy and governance, it was important to capture all of the resources that a single partner owned on a given project. Of those, 43,958 contracting relationships were not associated with a specific project, did not include a performance outcome, or were associated with projects that started before 1999, leaving 58,245 contracting relationships across 2,592 projects. I dropped 119 projects that took place at the regional level (e.g., spanned countries), given that the theoretical test of environmental uncertainty is measured at the country level. Finally, from the dataset of 2473 projects and 55,473 contractors, I dropped those projects (137) that have only one contracting relationship. Given that the study is of the behavior of partners within the project, I tested the model on projects with two or more contracts.[7] The model was thus tested on a dataset containing 55,370 contracting relationships undertaken by 45,883 unique contractors, across 2319 projects.

These 2319 projects took place across 135 countries, with China hosting the most projects at 134, and Brazil hosting the second greatest number of projects at 76. Given that the projects are partially funded by the World Bank, all of the projects take place in developing countries, with the average GDP per Capita across all countries at $4,344, with the maximum GDP per capita at $23,159. The 45,883 partners executing these projects are from 168 different home countries. Partners from China (4,290),

[7] As additional robustness checks, models were tested excluding two party project organizations, as well as excluding those contracting relationships that were beneath certain thresholds (e.g., 5% of contract, 1% of contract, and 0.1% of contract).

India (2,384), Vietnam (2,274) and the United States (1,968) are most represented in the set of partners. The average size of a project $50,700,000 and the average contract size is $21,200,000.

Dependent Variable

The emphasis of this study is temporary project organization outcome, specifically, a measure of the performance of the project in achieving its stated objectives. Following prior research (Denizer, Kauffman & Kraay, 2011; Limodio 2011), I use the IEG Outcome variable as a measure of project performance. The World Bank Independent Evaluation Group (IEG) provides a subjective assessment of the extent to which a project met its stated "development objective." The variable (*Outcome)* ranges from 1, for those projects that were rated highly unsatisfactory to 6 for those projects that were rated highly satisfactory in meeting their development objectives.[8] The IEG Project Outcome variable is close to a normal distribution, with a mean of 3.95 and a standard deviation of 1.00. The World Bank Independent Evaluation Group aims to be impartial and separate from the assessments made by other members of the bank (e.g., the project manager) to ensure that outcomes are not inflated or distorted by those with vested interested in the project. The IEG Project Outcome variable has long been used across a range of studies in exploring project performance and has been extensively reviewed as to its own credibility and lack of bias in accurately assessing project performance (see Denizer, et al 2011 for an extensive review). Thus, I believe it is a strong reflection of the performance of the temporary project organization.[9]

[8] IEG Rating Scale: 6 - Highly Satisfactory There were no shortcomings in the operation's achievement of its objectives, in its efficiency, or in its relevance; 5- Satisfactory There were minor shortcomings in the operation's achievement of its objectives, in its efficiency, or in its relevance; 4 - Moderately Satisfactory There were moderate shortcomings in the operation's achievement of its objectives, in its efficiency, or in its relevance; 3- Moderately Unsatisfactory There were significant shortcomings in the operation's achievement of its objectives, in its efficiency, or in its relevance; 2 - Unsatisfactory There were major shortcomings in the operation's achievement of its objectives, in its efficiency, or in its relevance. 1- Highly Unsatisfactory There were severe shortcomings in the operation's achievement of its objectives, in its efficiency, or in its relevance. *World Bank, Independent Evaluation Group*

[9] I ran robustness checks using a binary outcome variable (0/1) and an additional project outcome variable that measures "the risk that expected project outcomes will not be maintained". For the binary outcome variable and the additional risk outcome variable, the results were not robust to conventional significance levels, though the size and sign of estimates were consistent with the primary analyses.

Independent Variables

Hierarchy: Hierarchy impacts efficiency, coordination, conflict resolution between organizations and individuals operating at the boundaries of those organizations (Williamson, 1975, Bae & Gargiulo, 2004; Bleeke & Ernst, 1991; Blodgett 1992). In project management research, the "strong owner" is the firm or firms that control the majority of the financial resources of the project and can act with fewer constraints, and make efficient decisions (Winch & Leiringer, 2016).

To capture the extent of hierarchy in the temporary project organization, I use a measure of a Herfindahl Index Score for each temporary project organization, a measure most often used to measure the concentration of industries as determined by market shares of firms. The Herfindahl Index measures the concentration ratio, so it gives more weight to larger partners and takes into account the number of partners in the temporary project organization. For each temporary project organization, I compute a Herfindahl Index (*Hierarchy)* score using $\sum_{i=1}^{N} s_i^2$ where S_i is the ratio of contract amount for partner i over total amount across all partners and N is the number of partners on the project. The Herfindahl Index ranges from $1/N$ to 1, where values closest to 1 represent greater hierarchy (greater concentration of resources).

Environmental Uncertainty: Environmental uncertainty is measured by the distance between the partners of the temporary project organization institutional contexts and the institutional context of the country in which the project is taking place. Differences in the institutional context across countries, in particular differences in the regulatory environment impact organizational behavior, including choice of countries, partners, and entry modes (Eden & Miller 2004; Henisz 2000; Jensen & Szulanski, 2004; Kostova & Zaheer 1999; Xu & Shenkar 2002; Perkins, 2014). Poor institutional quality has been previously used as a measure of environmental uncertainty (Krishnan, et al 2016). However, as opposed to the absolute strength or weakness of the institutional environment as a measure of environmental uncertainty, I measure the relative distance between the institutional environment of the host country context and of the partners' home country contexts, an approach long used in the international business field (Ghemawat, 2007) and recently in the transaction cost field (Beugelsdijk et al., 2018). This is because temporary

project organizations that are comprised of partners from similar institutional contexts as the environment in which they are operating (even if that environment has a weak institutional context) may experience less uncertainty than a temporary project organization whose members have institutional contexts that are very different from the host country context.

Institutional distance is a multi-dimensional and time variant measure that goes beyond the historic measures of cross-cultural distance (Berry, Guillen & Zhou 2010). A company's home institutional environment is important because it shapes its values, norms, and a way of operating (Kostova, 1999). And, scholars have long shown that firms represent the values and norms determined in their home country (Hennart & Zeng, 2002; Park & Ungson, 1997; Parkhe, 1991) and that home country characteristics influences firms' perceptions of and behaviors towards each other (Ertug, Cuypers, Noorderhaven & Bensaou, 2013).

Following prior research by Lavie & Miller (2008), these institutional differences can be measured by the World Governance Indicators (WGI), a set of six factors that measure country differences across administrative and political national environments. The World Governance Indicators rate countries on a scale of 0-100 on the following six factors: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. For each host country (country where the project takes place) I average the six factors between the year 1999-2016 to get an aggregate WGI score. I compute the distance using the absolute between the host country's average WGI score and the WGI score for each individual partner on the project. I compute an overall score (*Environmental Uncertainty*) for the project organization by taking the average of the difference between the host country and each partner.

Lead Partner with Local Knowledge: The lead partner is defined as the partner with the greatest share of financial resources on the project. To determine if the lead partner has knowledge of the local context, I generated a dummy variable that took the value of 0 when the absolute value of the difference between the lead contractor's average WGI score and the host country's WGI score was less than or equal to the difference between the average WGI score of the temporary project organization and the host country.

Behavioral Uncertainty: A stable pool of partners in the temporary project organization allows for more repeated interactions and an increased ability to understand partner behavior and build trust (Doney & Cannon, 1997; Gulati & Sytch, 2008; Poppo, 2008). Temporary project organizations that have a greater percentage of partners starting at the beginning of the project – and thus, have more time to work together on the project – have a greater opportunity to build trust. This measure of time starting together is of particular importance in the temporary project organization because partners on these projects often have limited time together (Nordqvist et al., 2004), and the influence of partners is highest in the early phases of the project (Kolltveit & Grønhaug, 2004). As partners gain experience working together, behavioral uncertainty decreases (Santoro & McGill, 2005), as experience working together generates trust, and scholars have long extolled the benefits of mutual trust as a way to ensure that partners will not act in a way harmful to each other (McEvily, Perrone, & Zaheer, 2003). When partners have more time working together on the temporary project organization, partners may assume each other's behaviors are not meant to be detrimental to the group (McEvily, et al 2003) and allows for easier sharing of information amongst each other (Dyer & Chu, 2003). I measure the extent of behavioral uncertainty as the percentage of partners who started early in the life of the temporary project organization, where early is measured as starting in the first half of the project.[10] I subtract this number from one to develop a measure of uncertainty (*Behavioral Uncertainty)*, such that high uncertainty (fewer partners start early in the project) is closer to one, and low uncertainty (most contractors start early in the life of the project) is closer to zero. Temporary project organizations that have a greater percentage of partners starting at the beginning of the project – and thus, have more time to work together on the project – have a greater opportunity to build trust and decrease behavioral uncertainty.

Sector: Projects that have ex-ante key performance indicators, clear industry norms and regulations to shape behavior, and visible signs of progress may not need to monitor partner behavior as closely. In the infrastructure sector, key performance indicators are critical and almost universally defined as the project

[10] This measurement is not weighted by size of the contracts (i.e., giving more weight to larger contracts). In this dataset, the largest contractors on a project typically start earlier in the life of the project.

being on-time, on-budget, on-scope (Toor & Ogunlana, 2010; Flyvberg, 2017), and industry-wide norms help dictate and shape behavior of partners (Swärd, 2016). The World Bank classifies projects under eleven sectors. Sectors *Water, Energy & Mining, Information & Communication,* and *Transportation* are classified as infrastructure projects per the Bank's definition.[11]

Interactions: The interaction between Hierarchy, Behavioral Uncertainty, and Environmental Uncertainty was operationalized through interaction terms: (*Hierarchy * Environmental; Hierarchy * Behavioral)*.

Other Independent Variables: Following Denizer, et al (2011), and others, additional project level variables also significantly impact the performance of projects. To account for these, I control for project complexity as measured by the size of the project in dollars (*Project Size)*.[12] I control for the effects of sector differences by using a dummy variable for project sector (*Sector*), as well as annual differences with a dummy variable for the year that the project was approved (*Year*) consistent with past research (Denizer, et al 2011). Lastly, given that financing from the World Bank comes in different forms, I account for lending instrument (*Lending Instrument*) consistent with past research (Kilby & Michaelowa, 2018), as well as procurement type (*Procurement Type*) which I control for in the first stage model to account for the selection criteria of the partners in the temporary project organization.[13]

An extensive body of work demonstrates the importance of host country-level characteristics on project outcomes. Differences in country economic strength, institutional strength, policies, and infrastructure have all been shown to significantly impact the performance of these projects. Following Dollar & Levin (2011) and Denizer, et al (2011), I control for the strength of the host country economy

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[11] *Private Participation in Infrastructure – World Bank Group, Glossary.* World Bank. https://ppi.worldbank.org/en/methodology/glossary (retrieved April 5, 2021).

[12] Additionally, I ran robustness checks where I did not include contractors that comprised less than 1% of project revenues. This reduced the number of contractors in the overall dataset from 54,508 contracting relationships to 28,226 contracting relationships and reduced the average number of contractors on a project from 23 to 12 (with a max of 48 contractors). I include results in primary regression table.

[13] There are 13 different lending instruments that the World Bank deploys, depending on timing, project needs, and the borrowing agency. The most common instrument (1,460 projects) is the *specific investment loan* (SIL). Other instruments include *technical assistance loans, financial intermediary loans,* and *emergency recovery loans.* There are seven different financing types, which indicate the funding source of the loan, with the majority of types either funded by the IBRD or IDA. (World Bank Lending Instruments: Resources for Development Impact, 2001)

with a measure of GDP per capita averaged over the years of the dataset (*Host Country Economic Strength),* as well as the volatility of the host country economy with a measure of the natural log of the inflation rate (*Host Country Economic Volatility*). I also control for the institutional stability of the host country with a measure of the average WGI score of the host country (*Host Country Institutional Strength*), and control for other country-level effects through the use of country fixed effects (*Country)*.

Selection

A key consideration in exploring governance choice and performance is the inherent selection bias present: Managers choose a governance structure in response to observed and unobserved characteristics that are also likely to affect the performance of the organization (Brouthers, Brouthers & Werner, 2003). Past scholarship has typically accounted for selection through the use of a two-stage model estimating the probability of one governance choice over another in the first stage; then predicting performance in the second stage that uses a correction variable (e.g., Sampson, 2004; 2005; Brouthers, et al 2003).[14] However, the theoretical question of interest in this research is the extent of a market-like or hierarchy-like governance along a continuum chosen by the temporary project organization; therefore the standard models predicting a binary choice (e.g., choice of equity-based contract versus pooling contract) in the first stage are not appropriate.

To account for a continuous dependent variable in the first stage of the model, I follow Wooldridge (2015) and deploy a control function (CF) method to estimate *lambda*, the correction variable. In the CF method, *lambda* is the reduced form residuals of y_2 in the first stage of the model, where y_1 is the response (performance of the temporary project organization) and y_2 is the continuous treatment (market-like to hierarchy) that is subject to self-selection (Hausman, 1978; Wooldridge, 2015). In the second stage model, along with *lambda*, I also include the interaction of *lambda* and y_2 to test the null of exogeneity of y_2 (the heteroskedasticity-robust Hausman test). If this interaction is omitted, the

[14] There are broadly two approaches to account for selection when determining misalignment. Both approaches use a two-stage model, with the first approach (e.g., Masten et al, 1991) measuring transaction costs, and the second approach (e.g., Sampson, 2004) developing a measure of misalignment.

results are identical to that of the two stage least squares (2SLS) approach (Wooldridge, 2015). The selection model (first stage) includes the variables of interest included in the analysis of temporary project performance (second stage).[15] I also include a variable that indicates prior ties between partners, as measured by the total number of instances that partners in the project organization have worked together on past World Bank projects.[16] Absence of prior ties between partners has been shown to increase the likelihood of hierarchical governance (Santoro & McGill, 2005); however impact of prior ties on project performance is not straightforward. Past experience together has been shown to decrease future performance when partners were dissatisfied with each other (Hoang & Rothaermel, 2005) or increase performance as the firm experience helps build capabilities and trust in working together (Gulati & Sytch, 2008; Poppo, 2008). Fewer past ties predict greater hierarchy in the first stage, but do not predict performance in the second stage.

RESULTS

The dependent variable (*Outcome)* ranges from 1, for those projects that were rated highly unsatisfactory, to 6 for those projects that were rated highly satisfactory in meeting their objectives. The primary estimation approach is an ordinary least squares model.[17] Table 1 provides summary statistics and intercorrelations for all variables used to assess the performance of the temporary project organization.[18]

[INSERT TABLE 1 HERE]

Table 2 summarizes the results of eight separate regression models designed to test the two hypotheses. Model 1 is the first stage that predicts the extent of hierarchy in the temporary project

[15] As a robustness check, I also ran all models eliminating environmental and behavioral uncertainty in the first stage, as the governance choice may have been concurrent or prior to choices of partners.
[16] For example, in the temporary project organization with firms A, B, C and D, if firms A and B have worked on two prior projects together, and firms B and C have worked together on one prior project, the alliance would receive a score of "3".
[17] For an additional robustness check, I estimated the model using a tobit regression and an ordinal logistic regression given the categorical nature of the outcome variable. Results from both models show no differences in the size or significance of the estimations.
[18] Descriptive statistics were also run on the sample of infrastructure projects (n= 814) and no significant differences were present between the full sample and the sub-sample.

organization given the variables of interest. Models 2 through 4 examine the relationships between *outcome, hierarchy,* and the two types of uncertainty, *environmental uncertainty* and *behavioral uncertainty* after controlling for prior ties, host country institutional strength, host country economic stability and strength, project amount, and country, financing, procurement, year and sector dummies. Model 5 is the full model; Model 6 examines only infrastructure projects, and Model 7 excludes the selection control (*lambda* and *lambda*hierarchy*).

[INSERT TABLE 2 HERE]

Hypothesis 1 suggests that as the environmental uncertainty of the temporary project organization increases, more hierarchy will help the performance of the temporary project organization, depending on whether the lead partner has knowledge of the local environment. In Model 3, the coefficient of *hierarchy * environmental uncertainty* in those projects where the lead partner has knowledge of the local context is positive and significant ($b = 0.019$ and $p = 0.013$), implying that in instances of environmental uncertainty, greater hierarchy improves the likelihood of project performance. In examining Model 4, which includes those projects where the lead partner does not have knowledge, results do not hold.

Hypothesis 2 predicts that depending on the type of project, under conditions of high behavioral uncertainty, more hierarchy will harm the performance of the temporary project organization. Across all types of projects (Model 5), there is no effect on performance; however, when only infrastructure projects are examined, the coefficient of *hierarchy * behavioral uncertainty* is negative and significant ($b = 2.13$ and $p = 0.045$), implying that in instances of behavioral uncertainty, greater hierarchy reduces project performance. Results hold in the full model when examining the conditional effects (infrastructure and lead partner) and when the selection criteria are removed (Models 8 and 9).

[INSERT FIGURE 1 HERE]

The economic impact of even a small change to the performance of the temporary project organization is significant and should be noted. Limited work exists in translating differences in project ratings to economically significant measures typical for large projects such as increased cost to deliver the project (over-budget) or increased amount of time for project completion. However, past research by

Kilby (2000) examines the economic rate of return of World Bank projects and shows that a 0.01 point change in the former four-point performance rating of the Bank translates to a 0.05 percentage point increase in the economic rate of return of the project. Kilby calculates for a $180 million project, a 5 basis point increase in the economic rate of return of the project (e.g., moving from the average rate of return of 15.7% to 15.75%) translates to $81,818. In Kilby's research, the average economic rate of return for an unsatisfactory project was calculated as 3.4%; the average economic rate of return for a satisfactory project is 19.8%. As a matter of comparison, in my analysis, in instances of high environmental uncertainty (e.g., two standard deviations above the mean), moving from an equally distributed project organization (0.25 concentration), to one with higher hierarchy (0.7 concentration) translates to approximately a 0.07 point increase in the predicted outcome of the project. To the extent that it is appropriate to extrapolate from Kilby's findings, this increase would be associated with an approximately 23 basis point increase to the economic rate of return, implying that even a small change to the outcome of the temporary project organization has the potential for a substantial economic impact.

Robustness Analysis

As an additional robustness check, I explore the number of partners in the temporary project organization. The total number of partners varies significantly: in this research setting, the average project organization has 23 partners, with a standard deviation of 24, and a maximum size of 299 partners. This variation is partially driven by the inclusion of all contracts required to execute the project: for example, a partner that receives a small contract to provide supplies in the building of a bridge is included in the organization. The phenomenon that this paper explores – dynamics related to hierarchy and the ability to influence and develop norms to manage uncertainty – may not extend to a small partner. Thus, it is important to ensure that the results are not being influenced by the long-tail partners that comprise the sample. I rerun all of the analyses eliminating those partners that comprised less than 1% of the total project revenues.[19] This reduced the sample of partners from 54,717 to 28,359; and reduced the average

[19] I also used 0.1% as a threshold which reduced the contractor sample from 54,717 to 48,596. Results remained consistent.

number of contractors on a project from 23 to 12 (and maximum from 299 to 48). Results hold across all models (see Model 10).

CONCLUSIONS & DISCUSSION

Prior to this research, scholars and practitioners may have concluded that the choice of governance structure in the temporary project organization was determined by the uncertainty that the organization faced, as aligned with transaction cost theory (Williamson, 1985). Yet past research lacks a theoretical and empirical understanding of the alignment between governance and uncertainty and the impact on the performance of the temporary project organization. To develop a more precise theory, I build on transaction cost theory, and specifically the impact of uncertainty on governance choice and on governance choice and performance (e.g., Casciaro, 2003; Krishnan, et al 2016; Sampson, 2004), and expand the prior, but limited work, on the temporary project organization's unique characteristics and plural governance structure (Eccles, 1981, Sanderson, 2012).

Past research is mixed and inconclusive on the direct effect of environmental uncertainty on governance choice (Cuypers & Martin, 2007), as past theory empirically and theoretically supports the view that the effect of environmental uncertainty on governance choice is contingent on asset specificity (Williamson, 1985). As a baseline, this study does not aim to be conclusive of the direct effect of environmental uncertainty, but rather this study shows that under conditions of environmental uncertainty, more hierarchy helps the performance of the temporary project organization. Environmental uncertainty—the uncertainty that results from an unknown or volatile external context—requires the temporary project organization to gather and disseminate knowledge about the unknown environment, and effectively manage external stakeholders. Hierarchy allows for efficiency in decision-making, especially once conflict has occurred (Lumineau & Malhotra, 2011), and for ease in coordinating information across partners (Van Marrewijk, et al, 2016). Furthermore, this study shows that the effect of hierarchy under conditions of environmental uncertainty is most pronounced in those temporary project organizations whose lead partner has some knowledge of the local environment. Hierarchy helps, but

only when the partner at the top of the hierarchy can share the *right* information or dictate the appropriate norms to the rest of the organization.

However, given the strong contingent relationship of asset specificity on environmental uncertainty (Williamson, 1985), there remains an open question as to whether the relationship between environmental uncertainty, hierarchy, and performance would change for the temporary project organization under varying degrees of asset specificity. In my analysis, I control for sector and procurement type, two potential high-level proxies for how non-specific the interactions are amongst the members of the temporary project organization (e.g., supplying goods versus developing and building a power plant); but a finer-grained measure of the overall nature of "asset-specificity" in the temporary project organization (e.g., does the project have a significant R&D component) is an important future avenue of research.[20]

Behavioral uncertainty is the difficulty in predicting the actions of partners (Williamson, 1985). Past empirical work is inconclusive on governance choice in light of behavioral uncertainty (David & Han, 2004), and as such, there remains an open question of whether hierarchy helps or harms the performance of the temporary project organization under high behavioral uncertainty. I predict and find that the relationship between behavioral uncertainty, hierarchy and performance is dependent on the type of project. Projects that are characterized by industry norms and regulations, as well as project-level key performance indicators and visible signs of task execution (Swärd, 2016) may require less monitoring of partners, and place a greater emphasis on trust and social mechanisms to be successful (Eccles, 1981). Thus, I posit that for these projects, as measured by projects in the infrastructure sector, trust-building with partners is critical, and more hierarchy has the potential to harm the project's ability to build cohesion and reduce conflict amongst partners.

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[20] Past work has typically looked at the asset-specific investments of a single partner, though recent research has begun to explore the asset-specific investments of both partners in a transaction (Poppo, Zhou, & Li, 2016; McEvily, Zaheer, & Kamal, 2017). For the temporary project organization, a group-level asset-specificity measure would be required.

This conditional effect of behavioral uncertainty provides additional insight to the debate of whether behavioral uncertainty should even be considered a distinct form of uncertainty, or if behavioral uncertainty is simply another lens on opportunism, an underlying assumption of transaction cost theory (Cuypers, et al 2021). Williamson (1981) vacillated between the importance of behavioral uncertainty and concluded that environmental uncertainty was the relevant type of uncertainty impacting governance of organizations (Williamson, 1991). This research does not directly address this debate, and neither refutes nor supports the view that a reduction in environmental uncertainty reduces behavioral uncertainty (Cuypers, et al 2021). This may be partially a result of the type of behavioral uncertainty considered in this research—time working with partners. Other types of behavioral uncertainty—such as partner differences—may more closely link to environmental uncertainty, especially in circumstances where partner differences are necessary to navigate environmental uncertainty (e.g. Dorobantu, et al 2019). As considered by others (e.g., Krishnan, et al 2016), further exploring the interplay between environmental and behavioral uncertainty on the governance—performance link is an important extension of this research.

I acknowledge both the "order view" and the "conflict view" of the temporary project organization: as theorized by the "order view" of the temporary project organization, hierarchy does indeed help under conditions of uncertainty, but, it remains important to consider—aligning with the "conflict view"— that there are potential downsides to hierarchy and fiat. More hierarchy in the temporary project organization can create conflict and competition, as partners push against the lead partners with access to project resources (Van Marrewijk, et al 2016). Hierarchy may harm the social capital, trust, and relational processes that are critical to project success (Clegg, et al, 2002). For example, under conditions of low environmental uncertainty where there is less need to rapidly make decisions or react quickly to a changing context, greater hierarchy may have a negative impact on the performance of the temporary project organization. Given the plural governance of the temporary project organization, this study helps to further shed light on when hierarchy might be harmful, and the micro-processes (e.g., competition, conflict, and distrust) that result from an unequal allocation of resources

amongst partners in the temporary project organization. A useful extension of this research would be to better understand what may prevent these project organizations from efficient organization (Nickerson & Silverman, 2003), and what strategies, if any, the project organization can take if organized inefficiently.

This paper makes several important contributions. First, it offers a deeper understanding of the temporary project organization and what contributes to the success of this organizational form, a form primarily studied through the project management and construction fields (e.g., Sydow & Braun 2017), but less so in the strategy and management fields. It builds on the work of management scholars such as Bechky (2006), Majchrzak, et al (2007), and Schwab, et al (2008), that examines the structure of the temporary project organization, and how control, coordination, and relational mechanisms impact the ability of the organization to achieve its stated goals. It also offers insight into how these temporary project organizations may incorporate mechanisms – whether a strong owner or a more equitable distribution of resources – to increase the likelihood of success. Past work on the temporary project organization has developed theories as to the importance of the external environment, and relationships between partners within the temporary project organization, but has so far primarily focused on supporting these theories through case-studies and other qualitative research. This study's empirical setting of 2319 temporary project organizations that span geographies and industries offers quantitative support for the factors that impact project success.

Second, this study extends our understanding of transaction cost theory in hybrid forms of organizations. Specifically, it builds on the growing but limited empirical work examining how misalignment between governance choice and the context in which the organization operates affects performance (Leiblein, 2003; Sampson, 2004; Sampson, 2007; Martin, 2013; Krishnan, et al, 2016). It contributes to this body of research in two important ways: first, it examines governance choice, uncertainty and performance in a hybrid organization, whereas past research focuses on two-party relationships. It offers an understanding of governance choice as a continuum (i.e., the degree of hierarchy) and utilizes a two-stage model to incorporate the continuous nature of the governance choice. Second, this study measures the group-level performance—as defined by whether the temporary project

organization reached its stated objectives—as opposed to the performance of a focal firm in the transaction. It heeds the call to examine governance choice and performance using a metric other than profitability (Cuypers, et al 2021), and heeds the call to examine the interplay of environmental and behavioral uncertainty (Krishnan, et al 2016).

Lastly, given its empirical setting, this study contributes uniquely to the extensive body of work in the international development and development economics fields examining the drivers of performance in World Bank-funded projects by exploring how the governance of these project impact performance. Despite vast literature exploring how project and country-level variables impact the success of these projects, limited research explores the impact firm characteristics have on project outcomes. A very small number of studies have begun to examine how firm characteristics impact these large projects: McLean (2017) examines firm procurement processes and firm political ties on World Bank projects; Malik & Stone (2018) examine if a project contractor is a Fortune 500 company. This paper—in examining partner experience and partners' institutional backgrounds—adds to this nascent and growing body of work.

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TABLES & FIGURES

Table 1: Descriptive Statistics and Correlation Matrix

Variable	Mean	Std. Dev.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Outcome	3.95	1.00	1.00	6.00	1.00							
(2) Hierarchy	0.25	0.20	0.01	1.00	-0.07	1.00						
(3) Environmental Uncertainty	12.63	14.19	0.00	86.27	-0.09	0.13	1.00					
(4) Behavioral Uncertainty	0.47	0.18	0.00	0.97	-0.03	-0.14	-0.08	1.00				
(5) Prior Ties	17.83	73.98	0.00	2779	-0.01	-0.15	-0.01	0.03	1.00			
(6) Project Size ($)	5.07E+07	1.21E+08	27433	2.01E+09	0.05	-0.07	-0.01	-0.02	0.09	1.00		
(7) Country Economic Strength	4299	3707	282	23160	0.06	0.03	-0.27	0.01	-0.06	0.03	1.00	
(8) Country Economic Volatility	0.07	0.06	0.00	0.46	-0.01	-0.04	0.11	0.00	0.05	0.06	-0.09	1.00
(9) Country Institutional Strength	35.15	15.39	0.76	86.06	0.08	0.01	-0.38	0.04	-0.09	0.00	0.64	-0.29

Table 2: Predicting Performance

Predicting Performance	Model 1: Predicting Hierarchy (First Stage)	Model 2: Environ-mental Uncertainty	Model 3: Lead Partner Knowledge	Model 4: Lead Partner No Knowledge	Model 5: Behavioral Uncertainty	Model 6: Behavioral Uncertainty Infrastructure	Model 7: Full Model	Model 8: Full Model Lead Partner Infrastructure	Model 9. Full Model No Lambda	Model 10: >1% Lead Partner Infrastructure
Hierarchy		0.389	-0.32	4.59*	-0.508	0.0864	-45.65	-6923.3	0.237	0.89
		(0.4)	(-0.28)	(2.05)	(-0.65)	(-0.06)	(-0.73)	(-0.02)	(-0.44)	(0.47)
Environmental Uncertainty	0.0026**	-0.0092*	-.0071	-0.019*			0.112	18.21	-0.0126*	-0.0112+
	(-6.8)	(-2.28)	(-1.39)	(-2.20)			(-0.68)	(-0.02)	(-2.24)	(-1.87)
Behavioral Uncertainty	-0.12**				-0.0821	0.243	-5.549	-840.9	0.309	0.392
	(-5.34)				(-0.37)	(-0.6)	(-0.73)	(-0.02)	(-0.82)	(-0.89)
Hierarchy * Environmental Uncertainty		0.017*	0.019*	0.0051			0.017*	0.0277*	0.0272*	0.026**
		(-2.54)	(2.24)	(0.31)			(-2.53)	(-2.46)	(-2.45)	(-2.57)
Hierarchy * Behavioral Uncertainty					-0.231	-2.156*	-0.173	-2.052*	-2.046*	-2.11*
					(-0.44)	(-2.07)	(-0.33)	(-1.97)	(-1.97)	(-2.04)
Prior Ties	-3.15E-04**	8.46E-05	1.44E-03*	4.39E-04	-2.89E-04	-2.70E-04	-1.44E-02	-2.181	-1.72E-04	2.47E-05
	(-5.75)	(-0.2)	(0.028)	(0.57)	(-0.76)	(-0.32)	(-0.73)	(-0.02)	(-0.24)	(-0.03)
Project Size ($)	-3.91E-11	1.53E-10	-1.18E-10	1.32E-09*	1.07E-10	2.15E-10	-1.65E-09	-2.71E-07	2.69E-10	2.66E-10
	(-1.02)	(-0.77)	(-0.55)	(2.39)	(-0.54)	(-0.92)	(-0.67)	(-0.02)	(-1.14)	(1.09)
Country Economic Strength	7.35E-06	-4.97E-04	-4.13E-04	0.0049+	-6.18E-04	-7.63E-03	-4.69E-03	-3.978	-0.000838	-0.000576
	(-0.48)	(-1.05)	(-0.88)	(1.78)	(-1.31)	(-0.36)	(-0.82)	(-0.02)	(-0.43)	(-0.26)
Country Economic Volatility	0	-7.49	-9.85	60.51+	-10.75+	-14.3	-117	-51178	-14.27	-11.11
	(.)	(-1.27)	(-1.59)	(1.81)	(-1.87)	(-0.56)	(-0.78)	(-0.02)	(-0.62)	(-0.41)
Country Institutional Strength	-0.010+	0.0077	0.116	0.16**	0.01	0.00752	0.071	-90.91	0.0126	0.0197
	(-1.68)	(-0.39)	(0.55)	(2.63)	(-0.53)	(-0.16)	(-0.8)	(-0.02)	(-0.3)	(-0.4)
lambda		-0.741	-0.70	-4.28+	0.466	0.582	45.38	6923.6		-0.225
		(-0.76)	(-0.06)	(-1.93)	(-0.59)	(-0.39)	(-0.72)	(-0.02)		(-0.11)
Hierarchy * *lambda*		-0.26	-0.08	-1.08	-0.22	0.013	-0.26	-0.233		-0.46
		(-0.56)	(-0.14)	(-1.10)	(-0.48)	-0.02	(-0.56)	(-0.30)		(-0.58)
Year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sector	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lending Instrument	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
cons	0.753**	5.470**	5.87**	-20.01+	6.018**	6.02	29.01	16135.1	6.481	5.318
	(-3.49)	(-2.71)	(2.92)	(-1.87)	(-2.98)	(-0.75)	(-0.9)	(-0.02)	(-0.89)	(-0.62)
N	2319	2319	1627	692	2319	814	2319	800	800	800

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01

Figure 1: Predicted Values by Hierarchy and Uncertainty