

Principles or templates? The antecedents and performance effects of cross-border knowledge transfer

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Abstract

Research Summary: Strategic use of codified knowledge across borders can be a vital component for project-based work. Analyzing 237 global consulting projects, we examine the performance effects of drawing upon different types of codified knowledge. We argue and find that using principle-based forms of knowledge is likely to improve a project's customer responsiveness, whereas using template-based knowledge increases a project's cost effectiveness. We also explore what drives project managers to select different forms of knowledge in the first place. Specifically, we find that manager experience drives knowledge principle use, whereas institutional distance drives knowledge template use. Taken together, our findings suggest that organizations need to carefully consider the performance implications of different types of codified knowledge that get used and understand what drives managers to use them.

Managerial Summary: Managers understand the importance of knowledge management systems for project-based work. Efforts are often made to ensure that knowledge is codified and disseminated throughout the firm so employees can draw upon them to complete their projects. Unfortunately, however, such efforts often lead to stockpiles of information that remain untapped and underutilized. This study seeks to answer two questions. First, how can managers influence workers to utilize different types of codified knowledge in the first place? Second, do different types of codified knowledge have differential

effects on performance? We find that increased individual experience drives the use of knowledge principles, whereas workers that are more distant are more likely to use knowledge templates. At the same time, we find that when individuals draw upon knowledge principles it increases the customer responsiveness of their projects, whereas the use of knowledge templates increases cost effectiveness. This suggests that project-based firms should carefully consider codifying both knowledge templates as well as knowledge principles and consider how to incentivize workers to draw upon these different forms of knowledge.

KEY WORDS

Bayesian estimation, cross-border knowledge transfer, knowledge principles, knowledge templates, project performance

1 | INTRODUCTION

Once confined to consulting and aerospace industries, project-based work is increasingly becoming a predominant form of organizing in high-tech, banking, retail, and other sectors in the global economy (Barley, Bechky, & Milliken, 2017; ILO, 2015). The success of project-based work is often dependent upon successfully sharing knowledge from one project to the next (Staats, 2012). This requires project managers to not only identify which forms of knowledge are most likely to lead to success but it also requires them to proactively turn to codified forms of past knowledge dispersed within a global context (Hansen & Haas, 2001). The purpose of this article is to explore two questions: First, how do different forms of codified knowledge relate to performance? Second, what factors at the individual and organizational level are associated with the use of these different forms of knowledge in the first place?

Because reusing knowledge across contexts and geographies is difficult (Puranam & Srikanth, 2007), firms try to ensure that knowledge is codified in documents and other forms of institutional memory (Zollo & Winter, 2002). In terms of how knowledge is codified, there are two primary forms: (a) general principles of the knowledge, or (b) specific templates of the knowledge (Baden-Fuller & Winter, 2007). Templates provide a pattern or a model for other individuals to copy. A template might be a project prototype or how to document that walks a project manager through the steps needed to successfully replicate a project. For instance, Orr (1996) found that Xerox workers effectively transferred knowledge by providing strict repair guides (i.e., templates) that helped other workers fix copiers in a step-by-step fashion.

Principles, conversely, provide a fundamental, primary, or general law or truth to guide individuals (Baden-Fuller & Winter, 2007). A principle may be a list of best practices, key questions, or cause-and-effect associations that provide a theoretical explanation for why they might be useful as a general guideline for other projects. For instance, IKEA uses principles to provide “general

instructions on store design, HR management, etc." to help stores adhere to general principles that make the IKEA concept work (Jonsson & Foss, 2011, p. 1089).

We suggest that accessing documents in which the nature of the knowledge is principle-based will allow project managers to more flexibly respond to customer needs, whereas accessing template-based documents will allow project managers to generate greater cost efficiencies for the firm. Being responsive to customers and being cost efficient represent two key indicators of project performance (Faraj & Sproull, 2000). To ensure quality, firms must be responsive to their customer needs. To maintain financial viability, firms must keep their costs down.

Knowing which form of codified knowledge leads to which type of performance can help steer project managers toward requisite knowledge, but predicting what types of knowledge project managers are likely to draw upon can help steer those assigning project managers to certain projects. Past research points out that project members often rely upon individual experience as well as firm-level factors to determine what kinds of knowledge to use (e.g., Staats, Brunner, & Upton, 2011). We suggest that individual factors such as project-specific training, experience within the country, and industry experience are likely associated with the use of principles. Conversely, firm-level factors that put project managers on the periphery, such as geographic and institutional distance, are likely related to the use of templates. In general, we suggest that individual experience is more influential in driving principle use, whereas firm-level factors are more likely to influence template use.

To test our theoretical model, we examined 237 consulting projects in a large global professional service firm over a 4-year period. We obtained archival data for each project, including project performance outcomes and surveyed project managers to assess which form of codified knowledge they used on their projects as well as to find out about their prior work experience. We discuss implications for firms seeking to build a more strategic approach to manage individuals and leverage codified knowledge for improved performance.

2 | PRINCIPLES, TEMPLATES, AND PROJECT PERFORMANCE

Global firms tend to rely on formal knowledge management systems to ensure knowledge transfers across geographic locations. In establishing knowledge management systems, firms create repositories for internal documents that have captured employee experiences. These internal documents take on many forms, from project completion reports, to process checklists, to sample templates, to experiential stories (Morris & Oldroyd, 2009).

Effectively using knowledge documents from different locations can increase firm performance (Jonsson & Foss, 2011; Szulanski, Cappetta, & Jensen, 2004), but what type of performance it increases may depend on the form in which the knowledge was codified. Principles and templates emphasize two distinct forms of knowledge codification found within firms. On one hand, templates demonstrate *what* operations entail; they store and convey basic, process-based knowledge; and they provide detailed forms for employees to emulate (Baden-Fuller & Winter, 2007). For example, within the consulting industry, companies like McKinsey have employees turn to project completion reports that walk them through the specific steps other consulting teams have done in completing their own projects. These documents are not designed to explain why something was done, but rather to provide a detailed step-by-step log of what the team did during the engagement and allows subsequent projects to copy their efforts.

On the other hand, principles demonstrate the *why* in knowledge; they include experiential stories, cause and effect relationships, and keys lessons learned. For example, in addition to writing a project

completion report that represents a template, a consultant at McKinsey might decide to convey some explanation behind why what they did during the project worked or did not work. The story could be used to explain the unique context they were in while conveying some underlying rules or principles behind their decisions. These stories do not specifically tell someone the steps that need to be taken but rather prioritize rationales for institutional operations, leaving the finer details to the individual user (e.g., Eisenhardt, Furr, & Bingham, 2010; Gardner, Gino, & Staats, 2012).

Although a document could contain elements of both knowledge forms, the forms remain distinct. For instance, a document might first include the steps required to complete a process and then have a section to explain why these steps are necessary. Internal knowledge documents must entail either or both of these forms, and so, the two forms often collectively represent the nature of a firm's approach to knowledge management systems (Zack, 1999). Each is effective for its own purpose and, in our context, each is codified in a distinct document type.

2.1 | Knowledge templates and cost efficiency

Templates are an efficient method of transferring standard knowledge across borders (Jensen & Szulanski, 2007). Bingham and Davis (2011, p. 48) highlight the efficiency of template-based learning, noting that the goal of this approach "is to gain the benefits of accumulated knowledge while avoiding the expense of accumulated experience." The use of templates makes cost efficiency more likely because templates are often referred to as "proof" or "best practices" for optimally allocating resources and minimizing waste. Templates likely induce adoption of unfamiliar practices without trial and/or modification (Miner & Mezias, 1996). Moreover, templates increase the acceptance of cross-border initiatives and improve employee performance within those initiatives (Jensen & Szulanski, 2007).

In addition, templates are often codified to actively resist costly modification. For instance, Szulanski and Jensen (2006) demonstrate that international franchisors engaging in exact replication of templates across geographic boundaries were able to get their franchise operations up and running more quickly. In general, units attempting to make adaptations for local customers from knowledge templates often unintentionally increase the costs of implementation, which, in turn, slows down the work. The strength of codified knowledge templates is their ability to clearly and efficiently replicate knowledge from one context to another (Kostova & Zaheer, 1999).

Hypothesis (H1). *When managers use knowledge templates, their projects are more likely to be cost efficient.*

2.2 | Knowledge principles and customer responsiveness

In contrast to templates, the use of codified principles will likely increase a project's ability to respond to specific customer needs because principles are by nature flexible and adaptable to multiple contexts. Principles-based knowledge transfer works well for flexible repurposing, as principles afford the local user significant flexibility in determining how to adapt foreign knowledge to the local customer, as was found in Jonsson and Foss's (2011) research on IKEA. Along these same lines, Baden-Fuller and Winter (2007, p. 30) describe how senior management at Novotel Hotels used knowledge principles to improve local customer adaptation.

Knowledge principles offer project managers a broad understanding of larger organizational practices, as well as a flexible means of using prior experience to predict causality in organizational actions. For instance, Oldroyd and Gulati (2010) describe how a multinational gaming company created general principles for achieving particular customer goals, including universal recognition of customers and tiered service and customer support. This strategy fundamentally changed the company's practices, including its customer loyalty and rewards systems, across both business units and geographic regions.

Hypothesis (H2). *When managers use knowledge principles, their projects are more likely to be responsive to customers.*

3 | PREDICTING KNOWLEDGE USE

Scholars have pointed out the duel necessity of projects to produce both quality and efficiency (Faraj & Sproull, 2000; Huckman & Staats, 2011; Staats et al., 2011). Project managers are most often evaluated and rewarded based on their ability to respond to customer needs while also completing their projects on time and under budget. However, even if managers are incentivized based on these duel performance objectives, it does not necessarily mean that managers will simply draw upon the knowledge that aligns with the performance needed. Because firms and individuals do not always agree in their objectives, agency issues arise. Managers may generate agency costs that are inconsistent with project objectives as they use codified knowledge that aligns with their organizational positions or individual experiences and not the firm or customer (Pierce, 2012). In such cases, knowledge benefits can be nullified when managerial ability and interests are not aligned with firm objectives (Gartenberg & Pierce, 2017).

As a result, it is often not enough for firms to know which forms of knowledge are most beneficial for performance. Rather, firms should also understand which individual and organizational factors might influence project leaders to access different types of knowledge in the first place. For example, managers are likely to make knowledge consumption choices based on their abilities to use knowledge and the needs of the project, selecting forms of knowledge that are most useful to them given their unique skills and abilities to utilize the knowledge (Rosenkopf & Almeida, 2003). Managers may also be influenced by firm-level factors such as geographic, firm, and institutional distance that make them more or less likely to be able to reuse knowledge in a new context (Hansen & Haas, 2001; Kostova & Roth, 2003). In general, both individual and firm-level experiences provide managers with abilities, motivations, and opportunities that may shape how they access existing knowledge and use it in new settings (Jiang, Lepak, Hu, & Baer, 2012).

3.1 | Individual factors and knowledge principle use

The use of both principles and/or templates in any firm often requires significant effort by the user (Szulanski, 1996). However, using codified principles-based knowledge is particularly difficult. Baden-Fuller and Winter (2007, p. 20) note, "Principles typically require the actors to be fully and emotionally engaged in the practice" and requires "unusual personal effort" (Baden-Fuller & Winter, 2007, p. 20).

Managers who have high levels of local experience, such as higher tenure in the local country and greater understanding of the local language, are more likely to grasp the nuance required to

successfully use knowledge in a local context and as a result utilize more of it. As described by Morris and Snell (2011, p. 809), those with local knowledge "may be better equipped to interpret the idiosyncratic challenges and opportunities that arise in a given host country." Such managers may be able to effectively utilize principles-based documents from different parts of the company and figure out how to apply the general principles to their customers.

In addition, human capital gained by receiving training and having industry experience in multiple countries may improve a manager's ability to draw upon principles. Kogut and Zander (1993) identify the importance of prior international experience as one of the most persistent findings in the work on cross-border technology transfer. In fact, a manager's prior experience with different people within the firm is a strong predictor of whether knowledge will be shared (Morris, Snell, & Bjorkman, 2016). Familiarity with international conditions likely increases employees' emotional engagement with and trust in knowledge imported from external contexts (Lawler & Yoon, 1996). As trust increases, managers become receptive to foreign knowledge, particularly when that knowledge is found in principles-based form (Baden-Fuller & Winter, 2007). Based on these arguments, we propose that, because of their openness to foreign ideas, social connections forged during international experiences and deeper understanding of the local customer context, employees with more robust individual experiences may possess the necessary drive and ability to effectively draw on principles-based codified knowledge sources.

Hypothesis (H3). *Experienced managers are more likely to resort to using knowledge principles.*

3.2 | Organizational factors and knowledge template use

The very properties that make principles-based forms of knowledge valuable to the firm also make that knowledge challenging to transfer and use across geographic and institutional distances. In each case, as the distance increases between the home and host country, the costs of transferring knowledge increases, and the likelihood of someone being able to apply the general principles decreases. Principles provide little guidance of how one might reuse knowledge in a completely different context (Zander & Kogut, 1995).

In contrast, template-based knowledge is more easily transmitted across geographic, organizational, and institutional domains, which reduces the costs to use it (Makhija & Ganesh, 1997). According to Schulz (2003, p. 446), using templates allows project teams to "process new incoming knowledge faster because it facilitates and speeds up the establishment of linkages between old and new knowledge." As Cantwell (2009) noted, information technology and templates have significantly decreased the costs of global knowledge reach. While the marginal cost of using codified templates decreases with distance, the marginal cost of understanding more nuanced principles may actually rise with distance (Audretsch, 1998; Beugelsdijk & Cornet, 2002). Given the challenge of using knowledge across geographic distances, we expect that a manager distant from source will tend to use templates (Szulanski & Jensen, 2006).

Moreover, firms often face additional costs in doing business due to differences in the institutions in which they operate (Kostova, 1999). As institutional distance increases, firms bear additional relational costs of monitoring, communicating, and trusting foreign counterparts (Eden & Miller, 2004). These differences can include cognitive differences, which are based in the beliefs or value systems, normative differences, which are based on the legitimate means to pursue goals, and regulatory differences, which are differences in rules and regulations (Eden & Miller, 2004). For example, Lyles

and Salk (1996) found that different norms and rules among joint-venture partners impeded the flow of knowledge, making templates a more viable option for knowledge transfer.

Hypothesis (H4). *Managers who are geographically and institutionally distant from the knowledge source are more likely to use knowledge templates.*

4 | METHODS

4.1 | Data and sample

To test our hypotheses, we explored the knowledge transfer choices and outcomes within a large global firm that focuses on management consulting with business, government, and nongovernmental agencies in over 100 countries. In consulting, success is often determined by a project team's ability to leverage knowledge resources (Huckman, Staats, & Upton, 2009; Von Nordenflycht, 2010). Our research in this area, then, takes advantage of a fertile ground for understanding how the use of codified knowledge affects project performance and what factors might influence project managers to access different forms of codified knowledge from previous projects within the firm (Zhang & Li, 2010).

In our sample, project managers are typically selected to lead a project based on four criteria: their geographic proximity, their availability, their location expertise, and their industry expertise. For example, in staffing a banking project in Vietnam, the company would look for available managers in Vietnam and then choose who has the most relevant experience for the banking project. Our analyses seek to better explain how geographic factors and individual expertise may be considered when selecting project managers, as these factors are likely to affect knowledge use and subsequent project performance. Once selected, all project managers were encouraged to use the codified knowledge available in the firm but no specific direction, requirements, or incentives were provided. Thus, managers had discretion to choose to use principles, templates, both, or neither when working on their projects.

Our study focuses on 237 consulting projects conducted over the 4-year period from 2006 to 2009. Each project had a project manager located in the country where the project was based. Project managers had an average duration of 3 years in the country prior to the commencement of the projects. Nearly all of the projects, whether serving one client or more, were specific to a single country; the few that spanned borders were specific to a single region, such as Central Africa, the Balkans, or Southeast Asia. Project objectives included increasing capacity, increasing market share, and developing a financial plan for foreign direct investment in the local market. Although all project managers were encouraged to utilize the firm's vast stocks of codified knowledge resources, use of these resources was not mandatory or incentivized.

Because of the firm's extensive involvement in global consulting, the codification of organizational knowledge is key to the firm's success. As such, the firm expends significant resources on the codification of relevant knowledge for each and every project. Specifically, the firm produces a template for each project in the form of an extensive "project completion report." These detailed reports are aimed to "capture the experience of other organizations through the transfer of encoded experience" (Levitt & March, 1988, p. 329). Each project template is painstakingly codified, owing to a combination of the firm's uncertainty as to which projects will need to be replicated in the future and

the relatively low cost of codification as compared with the cost of recreating the process-based and technical knowledge involved in each project.

In addition to undertaking extensive efforts to produce templates based on each project, the firm asked project managers to codify key principles from each project. These principles are codified in a short, three- to four-page summary of each project; summaries include a basic overview of the project, an overview of its objectives, and key lessons learned (including both positive and negative lessons). These principles highlighted the direct causal associations between stakeholder actions and specific outcomes.

All templates and principles are made fully available to all project managers through the firm's intranet. Additionally, both of these forms of codified knowledge are searchable by location, project objective, industry, revenue, and other relevant inputs. On average, project managers utilized principles alone in 42% of projects and templates alone in 20% of projects. Project managers used neither principles nor templates in 10% of projects, and they used both in 28% of projects.

Our study utilized three sources of data. First, we gathered information from the complete database of all consulting projects from the years 2006 to 2009, yielding a set of 1,525 projects. To avoid potential recall biases (Glick, Huber, Miller, Doty, & Sutcliffe, 1990), we focused on projects that were recently completed. We then further narrowed our focus to those overseen by a project manager who still worked for the company, which resulted in a smaller set of 620 projects.

We surveyed each of the 620 project managers. After repeated reminders, 267 managers responded to the survey, providing us with a 43% response rate. After cleaning and matching the data, we had 139 projects with complete archival and survey data for testing our performance-related hypotheses and 237 projects for our individual and organizational factors hypotheses. There were 142 project managers for the 237 projects in the study. The discrepancy in number of projects vs. project managers comes as some project managers led multiple projects over the 4-year duration of our data. To test for the possibility that our consulting project samples differed systematically from the universe of 1,525 or the 620 total projects surveyed, we ran several tests. In general, the projects in our final sample tended to be larger than the average project, and projects from the Europe and Central Asia and the Asian regions were more likely than North American projects to be in the final sample. Because we control for size and location in the models, these variations should not bias our results. There were no significant differences among the full set and our survey sample in cost efficiency (full set, mean and [standard deviation] 2.025 [0.623]), (survey sample, mean and [standard deviation] 2.009 [0.648]; $p = .531$) or customer responsiveness (full set, mean and [standard deviation] 2.025 [0.623]), (survey sample, mean [standard deviation] 2.017 [0.628]; $p = .813$) nor among the full data set and the final projects used in our analysis of performance (cost efficiency [full data mean, {standard deviation}, 2.025 [0.623]], (final sample mean and [standard deviation] 2.097 [0.558]; $p = .223$), (customer responsiveness mean 2.025 [0.623], 2.100 [0.614]; $p = .208$).

Another major concern for our research was the possibility that "successful" project managers responded disproportionately to the survey. We used data to test if those project managers who received excellent ratings in customer responsiveness or cost efficiency were more likely than other project managers to respond to the survey. Ultimately, neither of the performance measures—cost efficiency (mean and [standard deviation] 2.025 [0.623], 2.097 [0.558]; $p = .15$) nor customer responsiveness (mean and [standard deviation] 2.025 [0.623], 2.089 [0.589]; $p = .14$)—was a significant predictor of project manager survey response.

For each project, we matched project data and survey data with archival performance data where available. We assessed project performance using project evaluation data collected by a semiautonomous Metrics and Evaluation (M&E) Unit within the company. This performance evaluation unit

assigns project performance measures to nearly all completed projects, basing assessments on predefined criteria specific to each project that are determined before the project begins. The unit sets a target for resource usage (i.e., time, money, and staff) as well as other specific measurable outcomes that are observable on the ground (e.g., response in meeting client needs, increase in new customers for the client, improved plant productivity, and increase in market share). After multiple reviews, final ratings are assigned by a full-time, dedicated, independent monitoring and evaluation staff within the organization. This M&E Unit takes great care to attend separately to two key performance objectives: cost efficiency and customer responsiveness. For most projects, efficiency and responsiveness are determined at separate points in time and by different individuals within the M&E Unit.

5 | MEASURES

5.1 | Dependent variables

5.1.1 | Customer responsiveness

This measure was determined by the degree to which the customer's specific goals and objectives were met by the consulting project. In the words of an internal document, customer responsiveness is the "desired final change, which measures the achievement of the original project goal," and "projects must be able to clearly demonstrate the impact they have achieved." Moreover, customer responsiveness is assessed based on project-specific criteria after the project has been completed. For example, an internal firm document states: "[consulting engagements] will need to be monitored post-completion for a period of months or years in order to effectively assess project impact." This is consistent with other consulting firms, who also measure aspects of client satisfaction or other long-term improvements to the client over time.

To determine customer responsiveness, the M&E Unit undertakes multiple means of assessment, including customer surveys and local sector or industry assessments, to determine whether a project may be directly linked to improvements for the customer or group of customers. For example, if a project was designed to develop a credit bureau in Ghana, the M&E Unit determines that project's degree of customer responsiveness by surveying the credit bureau's customers to measure whether customers saw improved quality of service that fit their local credit assessment needs. This provided a general customer satisfaction score. In addition to surveying customers of the client firm, the M&E Unit would then examine increases in sales, stock performance, and so forth, to determine how the project impacted the customer from a financial perspective. Finally, the unit would check to see how these performance results line up with the original goals set by the project team before starting the project.

If the project exceeded its goal, the project would receive a rating of *excellent*. If the project met its goal, the project would receive a rating of *satisfactory*, and finally, if the project did not perform to expectations it would receive a rating of *unsatisfactory*. In our sample, 13% of projects were rated excellent, 62% satisfactory, and 25% unsatisfactory in customer responsiveness.

5.1.2 | Cost efficiency

The M&E Unit also determines the cost efficiency of projects. In doing so, they evaluate the degree to which the project deviates from the schedule and allocated resources. Project efficiency is largely a measure of project costs. During the scoping stage of a project, project managers, in conjunction

with their supervisors, examine the customer's objectives and develop a specific budget and timeline for the project based on these needs.

The M&E Unit determines each project's efficiency level. After the completion of each project, the unit evaluates efficiency by measuring the degree to which the project met two key criteria: (a) the project was on budget and (b) the project was completed within the planned period. Based on these factors, the M&E Unit then rates the efficiency of each project as *excellent*, *satisfactory*, or *unsatisfactory*. In our sample, 11% of the projects were rated excellent, 69% were rated satisfactory, and 20% were rated unsatisfactory.

5.1.3 | Codified knowledge use

To test our hypotheses of knowledge use, we collected data by asking project managers whether they utilized a “project principles” document (*principle*) during their project. We coded each response 1 if the manager used a principle and 0 if not. Similarly, we measured knowledge template use by asking if project managers consulted a “previous project completion report” (*template*), coding the response 1 if the manager used a template and 0 if not.

We measured the prevalence of project managers using neither principles nor templates (10% of the projects, coded 1), as well as the prevalence of project managers using principles only (42% of the projects, coded 2), templates only (20% of the projects, coded 3), and principles and templates combined (28% of the projects, coded 4).

5.2 | Other variables

5.2.1 | Individual factors

To assess individual experience, we examined each manager's project-specific training, experience within the country, and industry experience. To measure project-specific training, we surveyed project managers on the extent to which they attended global and regional training sessions to help them in their project work. The question in the survey asked, “To what extent did you attend a [company-wide] training session related to your project?”

To measure experience within country, we measured the project manager's local language proficiency and tenure in the local country. The questions asked managers “How many years have you worked in your current location?” and “How well do you speak the local language? (1-not at all, 2-basic, 3-proficient, 4-fluent, 5-native).” The results indicate that 44% of project managers were native speakers, 31% indicated that they were fluent, 14% had a basic level of proficiency, and 11% had no local language ability. The average local tenure was 3 years.

To measure industry experience, we measured the project manager's “prior years of experience working in a related industry” prior to joining the firm, the number of foreign “languages spoken” by the manager, and by counting the number of countries in which he or she had “worked for longer than six months” (Haas, 2006). Previous tenure in a related industry ranged from 6 to 36 years, with an average of 15 years. Project managers spoke two languages on average; 36% were trilingual and 15% spoke four or more languages. Foreign experience ranged from previous placement in one country to previous placement in 18 countries, and 43% of managers had experience working in one or two countries, 21% had worked in three countries, and 23% had worked in four or more countries.

5.2.2 | Organizational factors

We explored the organizational-level factors that might impact knowledge utilization by creating measures of geographic, organizational, and institutional distance for the projects within the firm. Geographic distance was coded as the log of the miles from headquarters to the project's country office. Because headquarters acted as the central repository and editor of all codified internal documents, measuring the physical distance from headquarters to the location of the project manager demonstrated cultural and proximal barriers associated with someone's ease of accessing knowledge from that distant location. The average distance was 5,581 miles with a standard deviation of 2,755 miles and a maximum of 9,724 miles. We also calculated organizational distance, which examines how much knowledge project managers reported accessing from different units and different geographies across the organization. More specifically, if a project manager reported that she gathered knowledge inside her unit and local office, she received a score of 1. If the knowledge was from a different country and from a different unit, it received a score of 5. This score ranged from 1 to 5.

Institutional distance captures the difference between the institutional environments of two countries (Kostova, 1999). It is based on regulative, normative, and cognitive pillars of the institutional environment. We measured institutional distance by assessing cultural distance, which primarily involves normative and cognitive institutional distance (Eden & Miller, 2004). Using Kogut and Singh's (1988) cultural distance index formulation, we created a separate index from and deviation along all nine GLOBE indices. We corrected for variation differences within each dimension and used the average.

5.2.3 | Control variables

We controlled for numerous factors that might also influence the type of knowledge a project manager is likely to access and impact project performance. These factors include unique project characteristics, location, type of business, and reliance on alternative knowledge. First, we controlled for disparities in project characteristics by measuring the number of support staff required for each project (*support staff*). In doing so, we note that, though a large support staff may come with a substantial reserve of knowledge, larger numbers of workers also bring with them greater organizational and other process-related challenges.

Next, we controlled for the novelty of the project. Nearly 20% of projects were deemed "pilot" projects (*pilot*). Projects were classified as pilot projects if they were relatively new undertakings for the firm; because these projects covered newer knowledge domains, they were less likely to benefit from the reuse of codified organizational knowledge.

We further controlled for the location of the project by including a dummy for each of the following five regions outside of North America: Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, Asia, and Sub-Saharan Africa. Additionally, we controlled for differences in the line of business the project fell under, recognizing that projects with diverse goals may vary significantly in both organizational structure and necessary resources. The firm we studied undertakes projects in four diverse fields of business: Access to Finance (*access to finance*), Investment Climate (*investment climate*), Public–Private Partnerships (*public-private*), and Sustainable Business (*sustainable business*).

We further controlled for project managers' use of alternative knowledge sources. We identified several categories of alternative knowledge, including whether a project manager flew out an expert to help with the project (*flyout*), if he or she attended internal training sessions specific to the project

(*training*), if he or she contacted others within the organization via social media (*social media*), and if he or she contacted others via phone (*phone*). Controlling for these alternative sources of knowledge is key (Haas & Hansen, 2005), particularly as alternative knowledge sources proved popular with project managers in our study.

Table 1 presents the means, standard deviations, correlations, and reliabilities within the study.

5.3 | Description of empirical models

In the first model, the dependent variable is an assessment of the success of the project, as manifest through three categorical outcomes (i.e., unsatisfactory, satisfactory, and excellent). We modeled the impact of human capital and codified knowledge form on the performance of each project (denoted by i) using a multinomial logit:

$$\Pr(y_i = k \in \{\text{unsatisfactory, satisfactory, excellent}\}) = \frac{e^{u_{ik}}}{\sum_j e^{u_{ij}}}, \quad (1)$$

where the latent utility for each option is expressed as a linear function of the focal and control variables described above:

$$u_{ik} = \sum_h \gamma_{kh} c_{ih} + \gamma_{k1} \text{Prin} + \gamma_{k2} \text{Temp} + \varepsilon_{ik}, \quad (2)$$

where c_{ih} denotes the set of control variables (including an intercept), and Prin and Temp denote the use of principles and templates. For identification, we normalized the utility of the “satisfactory” project outcome to be equal to 0 (i.e., the baseline outcome). Estimated coefficients are therefore interpreted relative to this base outcome.

An econometric challenge in inferring the relationship between project performance and the use of codified knowledge is the fact that the latter are selected by the project manager, ostensibly with the intent to maximize success of the project. If the independent variables in a linear model (or generalized linear model) are selected with knowledge of their idiosyncratic (and heterogeneous) impact on the dependent variable, they are endogenous to the system of study and can lead to both biased and inconsistent inference if not explicitly included in the model.

As this is likely the case in this context, we addressed this problem by jointly modeling the outcome of the project (as expressed in Equation (1)) and the selection of codified knowledge (as expressed in Equation (3)). This methodology is consistent with the approach developed in Nandialath, Dotson, and Durand (2014) and implemented in Mackey, Barney, and Dotson (2017). Both of these papers show that joint modeling of the process of interest and the selection process for the endogenous independent variable result in the recovery of the true, causal effect of action on outcome. Further, the application of these approaches allowed us to formally test the assertion that the decision variables are endogenously determined, thus providing insight into the decision-making process of the managers in the study.

We formally modeled the selection of codified knowledge form (i.e., principles or templates) as a binary choice process where managers can use principles, templates, or a combination of the two. Managers select the type of codified knowledge as a function of its expected impact on performance (i.e., the response coefficients). In the case of the use of principles, this can be expressed as a logit where:

TABLE 1 Descriptive statistics and correlations

	Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10
1	Knowledge use	2.657	0.990	1.000	4.000										
2	Support staff	3.787	3.058	1.000	22.000	0.055									
3	Pilot	0.043	0.204	0.000	1.000	0.034	0.482								
4	Region ECA	0.209	0.408	0.000	1.000	-0.096	0.007	-0.111							
5	Region LAC	0.195	0.397	0.000	1.000	-0.055	-0.125	0.092	-0.281						
6	Region MENA	0.083	0.276	0.000	1.000	-0.075	-0.053	0.005	-0.170	-0.170					
7	Region A	0.108	0.311	0.000	1.000	0.114	-0.085	-0.074	-0.186	-0.186	-0.112				
8	Region SSA	0.130	0.337	0.000	1.000	0.100	-0.056	-0.026	-0.217	-0.217	-0.131	-0.144			
9	Investment climate	0.159	0.366	0.000	1.000	0.007	0.040	0.023	0.213	-0.065	0.058	-0.153	0.018		
10	Public-private	0.079	0.271	0.000	1.000	0.094	-0.042	-0.055	-0.054	-0.012	-0.023	-0.091	0.042	-0.114	
11	Sustainable business	0.531	0.500	0.000	1.000	-0.044	0.072	0.067	-0.165	0.019	0.062	-0.055	0.015	-0.474	-0.282
12	Flyout	1.390	0.489	1.000	2.000	-0.082	-0.120	0.007	-0.125	0.148	0.017	-0.083	0.023	-0.038	-0.170
13	Training	1.693	0.462	1.000	2.000	-0.001	-0.114	0.044	0.030	0.120	-0.016	0.020	0.054	-0.196	0.092
14	Social media	1.625	0.485	1.000	2.000	-0.052	0.022	0.076	-0.010	-0.031	0.008	0.049	-0.080	-0.017	-0.013
15	Phone	1.275	0.448	1.000	2.000	-0.102	-0.032	-0.044	0.059	-0.075	0.048	-0.020	-0.028	0.045	0.022
16	Local tenure	36.245	3.018	32.000	52.000	-0.020	0.069	0.160	0.089	0.144	-0.001	-0.145	-0.105	0.016	0.125
17	Language proficiency	4.087	1.294	1.000	5.000	-0.110	-0.062	0.020	0.115	0.084	0.091	-0.374	-0.005	0.104	0.024
18	Language count	2.556	0.925	1.000	6.000	0.048	0.002	0.056	-0.257	0.236	0.012	0.067	0.001	-0.078	0.031
19	Country experience	2.859	1.704	1.000	10.000	0.107	0.070	0.061	-0.083	0.043	0.051	0.095	-0.047	0.088	-0.037
20	Previous tenure	15.560	6.054	6.000	36.000	0.106	0.052	-0.074	0.038	-0.151	0.100	0.043	-0.055	-0.047	0.120
21	Related industry	1.282	0.451	1.000	2.000	-0.109	-0.169	-0.049	0.132	0.088	-0.056	0.000	0.014	0.256	-0.136
22	Geographic distance	8.763	0.354	7.250	9.182	0.044	0.101	-0.054	0.453	-0.370	-0.654	-0.045	0.304	0.049	-0.022
23	Institutional distance	2.512	1.255	1.000	5.000	0.153	0.079	0.023	-0.123	0.049	-0.072	0.077	0.026	-0.069	0.134
24	Organizational distance	3.084	1.368	1.000	5.000	0.037	-0.011	0.017	-0.018	0.090	-0.076	-0.071	0.048	-0.032	0.120

TABLE 1 (Continued)

Variable	11	12	13	14	15	16	17	18	19	20	21	22	23
12 Flyout		0.137											
13 Training		0.052		0.150									
14 Social media		-0.034	0.111		0.357								
15 Phone		-0.089	0.212		0.298		0.311						
16 Local tenure		0.066	0.000		0.197		0.063		0.058				
17 Language proficiency		0.059	0.131		-0.053		-0.145		0.067		0.375		
18 Language count		-0.003	-0.026		0.030		0.044		-0.102		-0.009		-0.035
19 Country experience		-0.096	-0.095		0.058		0.140		-0.087		-0.200		-0.521
20 Previous tenure		-0.034	-0.055		0.097		0.113		-0.033		-0.105		-0.270
21 Related industry		0.047	0.093		0.111		0.102		0.209		0.227		0.188
22 Geographic distance		-0.021	-0.114		-0.031		-0.046		-0.008		-0.126		-0.035
23 Institutional distance		-0.027	-0.224		-0.152		-0.153		-0.228		-0.107		-0.067
24 Organizational distance		-0.005	-0.149		-0.086		-0.019		-0.151		0.094		0.020
											0.116		-0.026
											-0.086		0.078
											-0.026		-0.057
											0.116		0.432

Abbreviations: A, Asia; ECA, Europe and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SSA, Sub-Saharan Africa.

$$\Pr(\text{Prin} = 1) = \frac{e^{\alpha_{\text{Prin}} \times \gamma_{k1}}}{1 + e^{\alpha_{\text{Prin}} \times \gamma_{k1}}}. \quad (3)$$

Information about the response coefficients is contained in both models as the parameter γ_{k1} appears in both Equations (1) and (3). The choice of templates can be modeled in a similar fashion. Following both Nandialath et al. (2014) and Mackey et al. (2017), we used Bayesian statistical methods to estimate the parameters of the model.

Specifically, we constructed a Markov chain Monte Carlo (MCMC) sampler that sequentially draws from the posterior distribution of all of the models' parameters. We iterated between draws of the parameters for Equation (2) and the endogenous selection equations for principles and templates following the parametric form of Equation (3). We ran each chain for 100,000 iterations and retained the last 50,000 iterations for inference. Convergence was assessed using standard methods. A more detailed explanation of our estimation can be found in the Supporting Information Appendix.

In our second model, to test our hypothesis regarding the link between human and firm level factors and reliance on codified knowledge modes, we used multinomial logistic regression models with standard errors clustered at the project manager level. We clustered errors by project manager because 15% of project managers were responsible for two projects, and 5% were responsible for three projects.

Our measures of knowledge use are constructed as an ordinal scale in which 1 connotes the use of neither principles nor templates, 2 connotes principle use, 3 connotes template use, and 4 connotes use of both principles and templates. Ordinal data can be analyzed using ordinal logistic regression if the data satisfy the assumption of proportional odds (e.g., assuming that a step from 1 to 2 is equivalent to a step from 2 to 3). Empirical tests reveal that our data violate this assumption (chi-squared test = 31.66 with a p value of .01). In light of this finding, we conduct our analysis using multinomial logistic regression, rather than ordinal logistic regression. Multinomial logistic regression makes no assumptions regarding the proportional ordering of the categories.

6 | RESULTS

Hypothesis H1 predicts that use of principles is positively correlated with customer responsiveness. Model I of Table 2 tests this hypothesis. Results demonstrate that managers who achieved excellent customer responsiveness ratings are significantly more likely than other projects to have used knowledge principles (7.27, 5% confidence interval 1.00–21.91), supporting Hypothesis H1.

Hypothesis H2 predicts that the manager's use of templates is correlated with their project's cost efficiency. Model II in Table 2 tests Hypothesis H2. We find that template use has a significant positive effect on projects rated as excellent in cost efficiency (2.26, 5% confidence interval 1.65–6.11), supporting Hypothesis H2. Moreover, an interesting finding that was not hypothesized is that the use of principles was negatively associated with projects rated as excellent in efficiency (−5.49, 5% confidence interval −10.69 to −1.72). This suggests that although the use of principles is helpful for customer responsiveness, it is likely to reduce the cost efficiency of projects.

The results of our test of the effects of human and organizational factors on knowledge consumption are found in Table 3. Model I of Table 3 demonstrates the effects of the control variables on project managers' use of principles, use of templates, and use of both principles and templates. Model II of Table 3 tests Hypothesis H3. Hypothesis H3 predicts that individual experience is associated with an increase in the use of codified knowledge. The results support Hypothesis H3, indicating that

TABLE 2 Performance and knowledge principle and template use

Variable	Model I—customer responsiveness						Model II—efficiency					
	Excellent			Unsatisfactory			Excellent			Unsatisfactory		
	Mean	2.50%	97.50%	Mean	2.50%	97.50%	Mean	2.50%	97.50%	Mean	2.50%	97.50%
Intercept	0.25	-0.57	1.17	0.07	-1.00	0.62	-2.10	-3.03	-0.36	-1.11	-2.41	-0.11
Support staff	-0.50	-1.22	0.15	-0.29	-0.72	0.06	-0.35	-0.64	-0.03	-0.50	-0.92	-0.11
Pilot	1.36	-0.99	4.79	-0.68	-2.19	0.37	0.90	-0.28	2.82	0.42	-0.53	1.26
Size	0.24	-0.56	0.86	0.54	0.02	1.09	-0.05	-0.65	0.65	-0.41	-0.86	0.16
Frontier	-1.49	-2.30	-0.08	-1.32	-2.10	-0.31	-0.04	-0.12	0.04	-3.48	-4.20	-2.61
Region ECA	1.06	0.32	1.66	1.13	0.29	2.08	-2.50	-4.45	-0.93	0.70	-0.04	1.91
Region LAC	-0.41	-1.09	0.64	0.97	0.27	1.52	-1.11	-1.94	-0.02	-0.89	-1.56	0.05
Region MENA	-1.80	-2.42	-1.20	-2.97	-5.11	-0.52	1.97	-0.05	3.30	-1.36	-2.17	-0.51
Region A	-0.28	-0.80	0.31	-0.84	-1.85	-0.03	-3.92	-5.75	-2.51	-1.20	-1.83	0.22
Region SSA	-2.59	-3.24	-2.10	-0.27	-1.05	0.96	-2.93	-3.39	-2.22	-0.38	-1.94	0.46
Investment climate	-1.39	-3.22	0.49	-0.67	-1.49	0.90	-3.66	-4.28	-2.83	2.42	1.97	2.94
Public-private	0.88	-0.05	2.03	-0.57	-1.18	0.02	-0.78	-1.49	-0.08	-0.96	-1.58	-0.29
Sustainable business	-0.84	-1.37	-0.30	-0.88	-3.12	0.57	1.19	0.41	2.00	0.32	-0.38	0.91
Flyout	-1.32	-1.92	-0.39	0.37	-0.64	1.30	0.90	0.08	2.06	0.51	-0.49	1.47
Training	-0.94	-1.80	-0.16	0.78	-0.04	1.33	-1.73	-2.24	-1.26	0.49	-0.44	1.19
Social media	-1.22	-1.92	-0.24	-0.37	-2.13	0.58	-1.26	-2.46	-0.38	0.69	-0.20	1.88
Phone	0.32	-0.53	1.54	0.41	-0.69	1.17	-0.38	-1.99	1.25	-1.36	-2.96	0.28
Local tenure	0.33	-0.02	0.52	0.00	-0.27	0.29	0.32	0.04	0.55	-0.06	-0.32	0.25
Language proficiency	-0.45	-1.06	0.30	0.32	-0.57	0.89	-1.82	-2.62	-0.70	0.30	-0.12	0.93
Language count	-0.24	-0.89	0.52	-1.23	-2.09	-0.42	0.20	-0.68	1.09	-0.63	-1.28	0.34
Country experience	0.76	0.19	1.46	0.95	0.09	1.79	0.13	-0.60	0.67	0.07	-0.50	0.49
Previous tenure	-0.01	-0.17	0.18	-0.12	-0.46	0.09	0.35	0.09	0.60	0.10	-0.03	0.27

TABLE 2 (Continued)

Variable	Model I—customer responsiveness						Model II—efficiency					
	Excellent			Unsatisfactory			Excellent			Unsatisfactory		
	Mean	2.50%	97.50%	Mean	2.50%	97.50%	Mean	2.50%	97.50%	Mean	2.50%	97.50%
Related industry	0.47	-0.34	1.26	-1.68	-2.78	-0.36	1.73	0.05	3.25	-1.42	-2.15	-0.52
Geographic distance	-1.98	-2.34	-1.33	-0.62	-1.82	0.72	-0.61	-1.04	0.10	0.57	-0.29	1.31
Institutional distance	0.39	0.01	0.76	-0.23	-0.93	0.57	-2.31	-2.87	-1.79	-1.68	-2.38	-0.87
Organizational distance	-0.44	-0.99	0.35	-0.84	-1.65	-0.19	1.55	0.76	2.55	0.30	-0.29	1.16
Principles	7.27	1.00	21.91	2.32	-4.03	9.28	-5.49	-10.69	-1.72	5.74	1.40	11.88
Templates	0.76	-6.55	10.01	0.71	-10.81	13.69	2.26	1.65	6.11	0.95	-1.84	3.67

Note: Mean values that do not span zero in the 2.50–97.5% confidence interval are significant at the $p = .05$ level. Coefficients are bolded for emphasis.

Abbreviations: A, Asia; ECA, Europe and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SSA, Sub-Saharan Africa.

TABLE 3 The impact of individual and organizational factors on knowledge principle and template use

TABLE 3 (Continued)

Variables	Model I			Model II		
	Principle	Template	Both	Principle	Template	Both
Chi-square	1,098.68			1,305.85		
n	266			237		
Pseudo R^2	0.167			0.285		

Note: p values are reported in brackets. Errors clustered at the project manager level are reported in parentheses. A full table with all the controls can be found in Supporting Information Appendix.

^aThe dependent variable of the multinomial logit model is use of knowledge (=1 for use of neither principles nor templates, =2 for use of principle, =3 for use of a template, and =4 for use of both principle and template). Use of neither is the benchmark outcome category.

actors with more country experience (0.935, $p = .009$), tenure (0.236, $p = .025$), and related industry experience (1.570, $p = .024$) are positively correlated with the use of principles.

Model II of Table 3 tests Hypothesis H4, which posits that distance is positively correlated with template use. We found some support for this hypothesis. Specifically, institutional distance (0.017, $p = .017$) is positively correlated with the use of templates. We also found but did not hypothesize that geographic distance (-7.488, $p = .001$) is negatively associated with the use of principles. This may be because distance is likely to make it difficult for individuals to draw upon principles.

7 | DISCUSSION

On the whole, we develop a framework to understand how the use of different forms of codified knowledge is linked to different performance outcomes and how firms can select project managers who are more likely to use the different forms of knowledge in the first place. Although prior studies have demonstrated that global companies benefit from institutional attributes that allow for greater cost efficiency and customer responsiveness (e.g., Bartlett & Ghoshal, 1989; Rivkin, 2001), our study links the use of different forms of codified knowledge to these specific outcomes.

Furthermore, this article increases our understanding of how microlevel factors might influence macrolevel outcomes. Specifically, our results suggest that attributes of individuals and organizations can act as important selection criteria that may increase the likelihood that project managers will use different forms of codified knowledge in the first place. This finding is particularly useful in a knowledge-based economy, where knowledge workers are afforded control and decision rights. We demonstrate that when employees have more individual experience they are likely to use principles, and as institutional distance increases they likely use templates. Hence, although a global company is likely to create the “social community” around knowledge integration, effectively transferring such knowledge may also depend upon the cognitive characteristics of the individuals within these social structures, rather than just the structure itself (Ambos & Ambos, 2008). Overall, a project team’s ability to be cost efficient and responsive to customers is not only a result of organizational design (e.g., knowledge systems) and social structure (e.g., personal networks; Kogut & Zander, 1993) but also an outcome of how the employees’ and firm’s characteristics enable them to use the codified knowledge in the first place.

7.1 | Implications

Our findings have several important implications for firms. First, firms should rigorously evaluate investments they make in knowledge management systems. Investing in codifying only one type of knowledge may limit the firm's potential to generate different project outcomes. The production and use of templates, for example, may improve project efficiency but not customer responsiveness; likewise, the production and use of principles may improve local responsiveness but not project efficiency. Firms, then, must consider the costs and benefits of preparing templates, which provide detailed, step-by-step process manuals for project work, as well as codifying principles that provide the key takeaways from past projects.

Second, a firm's stock of human capital and organizational distance may indirectly affect performance at the project level by influencing the extent to which actors use codified knowledge in the firm. Efforts to improve the stocks of human capital such as employee training that is relevant to the local market, employee rotation programs, corporate trainings, or communities of practice (Stahl, Björkman, & Morris, 2012) may have limited success. Isolated investments in human capital may compromise the vitality of knowledge transfer structures. Rather than making these isolated investments, then, firms should undertake a combined strategy that prioritizes development of both individual factors and activities that are attuned to distance within the firm. Indeed, these investments in technology may allow organizations to augment their knowledge transfer efforts that fail across distance with technology-based solutions that operate context free (Ambos & Ambos, 2008). Such an understanding of institutional distance may help drive individuals to use knowledge templates.

7.2 | Limitations and future research

Our results suggest several avenues for future research. We are one of the first to study the use of knowledge principles and templates simultaneously, and so this topic remains a fertile ground for further study. Future research might explore the additional and interactive effects of other types of organizational knowledge. For example, research on how learning capabilities affect the use of other types of codified and noncodified knowledge might be productive in exploring knowledge transfer utilization and success. Future research may also benefit by exploring tradeoffs or synergies inherent in the use of principles and templates. Building on the existing knowledge that principles provide flexibility while templates increase efficiency, future research may include key questions such as: Do project managers benefit from the sequential use of principles and templates? If so, in which order and to what extent do leaders utilize these important sources of knowledge? Can project managers draw on a particular combination of knowledge transfer modes to create project ambidexterity and build their transnational capabilities?

The nonrandom nature of project assignments presents an additional challenge and opportunity for research in this area. In our study, leaders are likely selected with an eye toward which type(s) of human capital they possess and how that human capital is projected to affect project success. Managers are also likely selected with regard to their expertise and knowledge utilization strategies. Future research could explore issues directly related to project manager selection and issues of individual agency (Pierce, 2012).

Additional factors such as organizational systems and social relationships may also guide employees' decisions as to which knowledge sources to access. Although our study focused on individual and organizational factors specifically, the social capital literature reveals a number of network characteristics that may influence learning preferences (Burt, 1995; Hansen, 1999; Reagans & McEvily, 2003). Future research could consider the implications of broad network characteristics as

well as specific tie characteristics in order to determine the extent to which these characteristics affect the utilization of codified knowledge within firms.

Finally, all knowledge recipient units in our study operated largely independent from the knowledge source unit and from headquarters. Project managers were free to choose which, if any, knowledge to use. Future research could vary the degree of autonomy in the relationship between knowledge recipient and source unit. For instance, to what extent does a determining factor such as human capital availability influence a manager's decision to transfer knowledge from one project to another within the context of an alternative structural relationship (e.g., an arm's-length market relationship or a top-down centralized hierarchy)? The hierarchical nature of interactions within the boundaries of a firm could have important implications for the nature and context of the attendant communications (Gartenberg & Pierce, 2017). Future research could help better ascertain how such structural factors might influence different forms of knowledge transfer.

8 | CONCLUSION

In this article, we have sought to explore key factors influencing how project managers utilize concentrated, codified knowledge within a large global firm. We found that knowledge principle use is positively linked to customer responsiveness and knowledge template use is positively linked to cost efficiency. We also found that project managers' experience is positively correlated with the use of codified knowledge principles within the firm and that institutional distance is positively correlated with the use of knowledge templates. Ultimately, project-based organizations must understand that the use of different forms of codified knowledge is likely to lead to different outcomes. Moreover, selecting project managers who are likely to use the right forms of codified knowledge in the first place requires assessing both individual and organizational factors.

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