

Coordination and Communication Challenges in Global Group Audits

Denise Hanes Downey
Villanova University

Jean C. Bedard
Bentley University

SUMMARY: Inspectors frequently identify deficiencies on global group audits (GGAs) attributed to problems in coordination and communication among the multiple participating firms. As GGAs involve large multinational entities with extensive global reach, the costs of audit failure are high. Prior research and theory suggest that coordination and communication challenges are common when interdependent teams perform work in complex environments. Studying actual experiences of 147 group audit leaders, we find that clients' size/regulatory status and global structure contribute to coordination/communication challenges, but language/cultural barriers are less important. We also investigate strategies that group auditors can use to mitigate challenges, finding that modularization (advance scripting of work) and ongoing communication (availability/use of communication channels) are not as effective as tacit coordination (leveraging common ground through knowledge/experience). The variation in knowledge of component teams reported by participants leads to the question of whether group auditors can influence the training and/or selection of component personnel.

Keywords: group audits; geographically distributed work; coordination; communication; culture; audit quality.

I. INTRODUCTION

Audits of multinational entities (termed global group audits; GGAs) are commonly conducted by multiple audit firms (IFAC 2007).¹ In these situations, a single audit firm (the “group” or “lead” auditor) takes responsibility for signing the audit opinion for the consolidated entity. The group auditor engages other firms (“component auditors”) near the

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¹ International Standard on Auditing (ISA) 600 (IFAC 2007) is the primary basis for the methodologies of the global firm networks, which also include certain other procedures required by the PCAOB (PCAOB 2016a). Consistent with the language in ISA 600, we refer to the consolidated entity as the “group” and local business units of the client as “component(s)” of the entity. We refer to the lead auditor who signs the consolidated financial statement opinion as the “group auditor” or “group engagement team.” The “component auditor” or “component engagement team” refers to audit firms engaged in foreign jurisdictions to perform work over local business units. We use the term “firm” to refer to the audit firm only, and “client” to refer to the audited entity.

entity's foreign operations to gather the evidence necessary to support the overall opinion (Modesti 2014). Auditing regulators have expressed continuing concern regarding the quality of GGAs, as inspection findings are frequent and recurring (PCAOB 2016a; IFIAR 2017).² PCAOB enforcement actions describe egregious GGA failures; e.g., a lack of professional skepticism by PwC-Brazil leading to the restatement of the Sara Lee Corporation's financials, and the inappropriate alteration of workpapers by Deloitte-Mexico (PCAOB 2016b; 2017). The PCAOB highlights problems with coordination and communication between group and component auditors as root causes of these deficiencies (Munter 2014; Ferguson 2016; PCAOB 2016a), while the IAASB (2013, 12) similarly attributes deficiencies to "inconsistency in the degree to which the group auditor becomes involved in the work of the component auditor." Given the global reach of these large multinational businesses and regulators' concerns, research is needed to promote understanding of the specific nature of factors contributing to difficulties in coordination and communication among firms within group audits, and the effectiveness of strategies that firms use to mitigate those difficulties.

To address these issues, we study actual experiences of U.S. group auditors in managing engagements of multinational entities. We ground our study in organization theory and the management literature on distributed work, which indicate that coordination and communication challenges are likely to be exacerbated when interdependent teams cannot directly view and have difficulty anticipating each other's actions (Srikanth and Puranam 2011; Puranam and Raveendran 2012). In these situations, coordination and communication failures arise because "reciprocal predictability of action" is inhibited (Srikanth and Puranam 2011). Studies in international business provide evidence that interdependence is especially problematic in a global setting (e.g., Ambos, Andersson, and Birkinshaw 2010; Yu and Zaheer 2010).

Based on inspection findings, regulators suggest that certain client and engagement complexity characteristics (i.e., client size, global structure, and language/cultural barriers) may be factors contributing to deficiencies in global group audits (PCAOB 2016a; Harris 2017). These suggestions are consistent with prior research theorizing that complexity further reduces reciprocal predictability of action, thus increasing coordination and communication challenges. We test whether these complexity characteristics are associated with coordination/communication challenges experienced in GGAs. Further, we test whether three strategies proposed by the management literature (and used by audit firms) reduce the effects of complexity on those challenges, and whether their influence is greater in high versus low complexity engagements.³ These strategies are: (1) *tacit coordination*; leveraging and developing common ground between team members through shared experiences and knowledge (Srikanth and Puranam 2011, 2014); (2) *modularization*; advance planning to standardize interactions between team members and minimize interdependencies while work is being performed (Sanchez and Mahoney 1996; MacDuffie 2007; Srikanth and Puranam 2011); and (3) *ongoing communication*; frequent and open communication, and employing methods providing more situational information and informational cues (Walther 2002; Vlaar, van Fenema, and Tiwari 2008; Srikanth and Puranam 2011). While all three strategies are suggested by prior research to increase reciprocal predictability of action in geographically distributed work, thus potentially improving outcomes, prior studies involve student teams or routine business settings (e.g., offshoring of back office services). Although regulators have considered adopting several of these strategies in practice (IAASB 2015b; PCAOB 2016a, 2017), the extent to which prior findings generalize to the highly complex, regulated context of auditing is unknown.

We test our hypotheses in a sample of 147 engagements identified by highly experienced U.S. group auditors from multiple Big 4 firms, regarding within-network GGAs in which they participated as a member of the group engagement team.⁴ To distinguish factors contributing to difficulty in managing these engagements, we used two versions of an experiential questionnaire: one in which participants described a component of an engagement with significant coordination/communication challenges, and another in which such challenges were of little significance (hereafter, "non-challenging") (Gibbins and Qu 2005; Gogan, McLaughlin, and Thomas 2014). In selecting challenging engagements, participants focused on issues related to all phases of the audit: timely or efficient completion of component work; obtaining clarity around documentation, open items, and matters arising from review of component work; and coordination/communication of the audit strategy, important updates, and information. From prior literature (e.g., Walther 2002; Hinds and Mortensen 2005; Srikanth and Puranam 2011), audit regulation (e.g., ISA 600), and assistance of professionals at participating firms, we developed measures of client and engagement characteristics and the three strategies (modularization, tacit coordination, and ongoing communication) potentially relevant in the GGA setting. We also employed open-ended questions to gain deeper insight into the nature of challenges or non-challenges, and details of coordination/communication between the group and component auditors.

² A recent report (IFIAR 2017) notes that the rate of deficiencies identified for GGAs is as high as those for accounting estimates/fair values, internal controls, and revenue recognition.

³ The mitigating effect of a given strategy may be more likely to be observed when the risk of coordination failure is sufficiently high, i.e., in contexts where strategies are most needed. In contrast, strategies may not be needed in less complex scenarios to reduce the threat of coordination failure, and thus mitigating effects may not be observed.

⁴ Our data were obtained through the Center for Audit Quality. All group auditors in our sample are member firms of large global networks, and are subject to the U.S. regulatory environment and legal system (i.e., the typical situation in audits of U.S. multinational entities). Limitations on data availability prevent comparing this sample with group audits led by smaller U.S.-based firms, or by non-U.S. firms.

We reduced client/engagement complexity variables to three significant factors: the client's size/regulatory status, the client's global structure (a greater number of components and the component team's requirement to also perform a statutory audit),⁵ and language/cultural barriers. Results indicate that challenging engagements are most associated with the client's size/regulatory status and global structure. In contrast, culture/language barriers are less important in distinguishing challenging from non-challenging GGAs. This implies that language/cultural barriers do not play a strong role in coordination/communication problems within our sample of within-network group audits. Regarding strategies, our results imply that tacit coordination (i.e., component auditor knowledge and experience) is most useful in mitigating the influence of complexity characteristics on the likelihood of challenges in the GGA setting. While quantitative models show that knowledgeable, experienced, and stable component team personnel are essential to achieving a smooth and efficient GGA, supplemental analysis of responses to open-ended questions suggests that group auditors focus less on tacit coordination factors relative to ongoing communication factors. This finding implies that prompting group auditors to assess the knowledge of component auditor personnel may be helpful (e.g., IFAC 2015; PCAOB 2016a). However, how group auditors could assess the knowledge of component auditor personnel, and to what extent they could influence staffing of component teams, are open questions. Such questions call attention to the impact of decentralized firm networks (i.e., loosely coupled, autonomous firms) on tacit coordination, and suggest that practitioners and regulators focus further on this issue.

We find that other strategies (e.g., modularization and use of electronic tools) are less effective than implied by prior research in other contexts. They help mitigate challenges in some circumstances, but do not always provide the intended benefit, particularly for large, public companies. This is a concern as current standards focus on the involvement of the group auditor, largely assuming that their activities are effective in controlling component auditor actions (e.g., IFAC 2007; PCAOB 2016a). However, group auditor adoption of modularization and/or ongoing communication may not be effective in itself, as these strategies require "buy-in" from component auditors. For example, global networks can provide electronic tools to group and component auditors, but our results suggest that they may not be adopted/used as intended across member firms. Thus, this result suggests that auditors should not expect that standardization of audit processes and tools will be sufficient to mitigate challenges on GGAs. The difficulty of mitigating challenges on larger, public companies supports regulators' concerns regarding the potential broad impact of a group audit failure (Doty 2011b; IFAC 2015; PCAOB 2016a).

II. BACKGROUND

The Global Group Audit Environment

Most large corporations maintain highly significant operations in multiple countries. For example, U.S.-domiciled multinational corporations added \$4.9 trillion of value to the global economy in 2013, employing 35.7 million people worldwide (Bureau of Economic Analysis [BEA] 2015). Providing cross-border audit services to these companies is important to audit firms, who have worked with trade organizations and nation-states to promote the globalization of auditing over the last several decades (Suddaby, Cooper, and Greenwood 2007). Audit firms have grown into large international entities, with global networks encompassing hundreds of national members or affiliates with common branding (Suddaby et al. 2007). The network structure permits group auditors to leverage qualified professionals across jurisdictions, while complying with the requirement in most countries that audit professionals be locally licensed (Carson 2009).⁶

To opine on the financial statements of a multinational entity, auditors often engage other firms within and/or outside their global networks due to their proximity to the entity's operations in foreign jurisdictions. Component auditors are involved in approximately 55 percent of audits performed by U.S. global network firms and 80 percent of audits of Fortune 500 companies (PCAOB 2016a). PCAOB observations suggest that U.S. audit firms rely largely on component auditors within their global network (Doty 2011a, 2011b), likely due to ease/efficiency and the common audit methodologies typically espoused across these networks (e.g., Winograd, Gerson, and Berlin 2000).

All global audit firm networks have policies that are intended to promote continuity in client service across the brand (Humphrey, Loft, and Woods 2009). However, member firms are subject to the laws and regulations of their local jurisdictions, and primarily focus on providing services to locally owned entities, as opposed to local components of multinational entities (Cooper, Greenwood, Hinings, and Brown 1998; Carson 2009). Thus, member firms do not passively adopt global methodologies, but rather adapt them to their local environments.⁷ While empirical evidence is limited, this raises the question

⁵ Local statutes in foreign jurisdictions often require that an audit be performed over the financial statements of the local business operations. While requirements vary, such audits are typically referred to as "statutory audits."

⁶ There are also disadvantages of the global network structure. When affiliates of a global network fail to detect a material misstatement or fraud, the entire global brand is damaged; e.g., Satyam Computer Services involved PwC India (SEC 2011); Sara Lee involved PwC Brazil (PCAOB 2017).

⁷ For example, Barrett, Cooper, and Jamal (2005, 11) report that a Canadian component auditor had sufficient autonomy to use a materiality level four times larger than the level prescribed by the group auditor, citing local conditions.

of the level of consistency achieved across global networks, and offers potential insight into the higher deficiency rates for non-U.S. member firms observed in PCAOB inspections (PCAOB 2016a).

Global Group Audit Methodologies

International Standard on Auditing (ISA) 600, the basis for global network firms' methodologies (PCAOB 2016a), requires the group auditor to direct and supervise all work pertaining to the financial statement audit opinion for the consolidated entity, including work performed by component auditors (IFAC 2007). The group auditor is responsible for setting the overall audit strategy, including materiality at both the group and component levels. For sufficient and appropriate evidence to be obtained, all components that are financially significant to the group must be audited and procedures must be performed over components presenting significant risk of material misstatement (IFAC 2007). The group auditor is required to discuss risks with the component auditor, communicate requirements and relevant information, and evaluate the component auditor's work (IFAC 2007). The group auditor evaluates the component auditor's work based on a "reporting package"; i.e., summary documentation of the work performed and the conclusions reached. Due to legal restrictions, reporting packages typically do not contain the actual supporting workpapers or original evidence, and the group and component auditors typically do not possess access to each other's engagement files, resulting in information asymmetry between teams. Following the evaluation of the reporting package, the group auditor is required to discuss significant matters that have arisen and to determine whether additional review is necessary (IFAC 2007). Importantly, the group auditor must satisfy these requirements regardless of whether the component auditor belongs to the global firm network (IAASB 2007).⁸

In sum, the group auditor typically has full responsibility for signing the audit opinion, but must rely on multiple other firms performing parts of the overall engagement, with limited ability to observe the processes that the other firms use to perform their duties. Under these circumstances, audit quality depends on effective coordination and communication between group and component auditors. However, the International Forum of Independent Audit Regulators (IFIAR) identified deficiencies on 11 percent of GGAs inspected in 2016, while in 2013 PCAOB "inspections staff identified significant audit deficiencies in more than 40 percent of the inspected work performed for lead auditors by non-US global network firms" (PCAOB 2016a, 16; IFIAR 2017). The "frequent" and "recurring" deficiencies in this area (IFIAR 2017, 13) are linked by regulators to failures in coordination and communication (Doty 2011b; IAASB 2015a; Munter 2014; PCAOB 2016a).⁹ Examples include unresolved issues between group and component auditors, noncompliance with group auditor instructions, insufficient audit testing, and failure of component auditors to communicate significant issues (Doty 2011b; Munter 2014; PCAOB 2016a).

III. THEORY AND HYPOTHESES DEVELOPMENT

Organization Theory Applied to Distributed Work Environments

Organization theory proposes that a firm's ability to achieve its objectives depends on the division of tasks among agents, and subsequent integration of their work products (Puranam and Raveendran 2012). Agents are considered interdependent when at least one is evaluated based on the combined output; i.e., "the optimal action of each agent depends on a prediction of what the other agents will do" (Puranam and Raveendran 2012, 199). Group and component auditors are interdependent because the group auditor is evaluated based on the accuracy of the audit report, the product of their integrated efforts. When agents are interdependent, *reciprocal predictability of action* is required. When other agents' actions are difficult to predict, coordination failures occur (Puranam, Raveendran, and Knudsen 2012).

Research in game theory, linguistics, social psychology, and organization theory suggests that coordination/communication failures are observed as "delay, misunderstanding, poor synchronization and ineffective communication" between agents (e.g., March and Simon 1958; Schelling 1960; Weick 1993; Clark 1996; Heath and Staudenmayer 2000; Puranam et al. 2012, 425). To reduce these failures, firms may minimize interdependence between agents by: (1) evaluating based on individual output; and/or (2) altering the work process so that agents do not perform work simultaneously (Puranam et al. 2012). Auditors cannot minimize the fundamental interdependence between group and component auditors due to standards

⁸ The PCAOB (2016a, A1-22) defines other (i.e., component) auditors to be "any member of the engagement team who is not a partner, principal, shareholder, or employee of lead (i.e., group) auditor; and a public accounting firm, if any, of which such engagement team member is a partner, principal, shareholder, or employee." The PCAOB proposed standard applies to all individual/firms meeting this definition. As in-network component auditors located in foreign jurisdictions and group auditors belong to legally separate firms, the proposed standard applies equally to in-network and out-of-network component auditors in GGAs.

⁹ For example, PCAOB Chairman James Doty (2011b) notes, "Inspectors have found obvious errors that could have, and should have, been picked up by the [group] auditor, if communication between the two auditors had been more robust." Similarly, the PCAOB Director of the Division of Registration and Inspection suggests that "a main lesson to be learned for our multiple firm inspections is that communication along with supervision and review leads to a better audit" (Munter 2014).

and regulatory requirements. However, firms may implement strategies to improve the formation of predictive knowledge between agents (Puranam and Raveendran 2012). Such strategies are likely to be more necessary as complexity increases and further constrains the ability of agents to predict each other's actions (Puranam et al. 2012).

Sources of Complexity in Global Group Audits

In general, reciprocal predictability of action between agents is more limited in situations of greater complexity, increasing the likelihood of coordination and communication failures (Puranam et al. 2012). In the context of GGAs, we propose that the difficulties associated with performing interdependent work are likely to be exacerbated by several sources of complexity specific to the auditing context; i.e., client and engagement characteristics that complicate the group auditor's task in managing the engagement by making it more difficult for group and component auditors to predict each other's actions.

First, greater client size is likely to inhibit reciprocal predictability of action. Larger entities require more extensive audit work, due to greater volume and complexity of transactions. Larger clients may require the use of specialists (e.g., Hux 2017), increasing the number of the interdependent agents and thus the likelihood of coordination/communication failures. Larger companies are also likely to be more heavily regulated. For instance, SOX 404 internal control testing is a particularly problematic area of GGAs (Sunderland and Trompeter 2017), as it increases interdependence of the work between the group and component auditors (i.e., testing common controls), and foreign auditors may be unfamiliar with the uniquely stringent U.S. regulations.

Second, the structure of a GGA is also likely to influence reciprocal predictability of action. GGAs can differ considerably in the number of components spread across the globe. As the number of components increases, the group auditor must explain the audit strategy to more teams and monitor their work to assess the sufficiency and appropriateness of evidence obtained. Thus, the coordination and communication effort required to obtain adequate understanding of each team's activity could constrain resources (Puranam et al. 2012). The organizational structure of groups can also differ, requiring multiple levels of coordination and communication that complicate team integration (Puranam and Raveendran 2012; Puranam et al. 2012), and could reduce reciprocal predictability of action. For instance, in some engagements, the group auditor might work directly with a "supervising component" team, which manages audit work done by one or more sub-components and reports the consolidated work upward to the group auditor. Statutory audit requirements at the component level could also decrease reciprocal predictability, as this essentially creates a dual-purpose engagement for component auditors with potential for conflicting pressures, incentives, timelines, and materiality levels. In this situation, components might adapt group audit instructions to align with the content and timing of statutory rather than group work, increasing the coordination/communication challenges of the group auditor. Additionally, the group auditor might engage a team other than the component auditor to perform a portion of the component audit work (e.g., processes at a shared service center). If so, the group auditor will need to provide oversight to that team and disseminate relevant findings to the components.

Third, engaging component auditors in foreign jurisdictions in which the client does business may increase the difficulty of performing interdependent work due to differences in language and culture (e.g., PCAOB 2016a). Such differences could create greater variation in team members' judgments and decisions (Nolder and Riley 2014), making it more difficult to achieve integration and lowering the group auditor's effective span of control (e.g., Puranam et al. 2012). Further, Nolder and Riley (2014) posit that cultural differences may influence how team members collect evidence, assess risk, and resolve conflict, leading to variation in professional skepticism (Sunderland and Trompeter 2017). For example, cultural tendencies may lead auditors to be less direct in communications and to maintain closer relationships with clients (Bik 2010).

In sum, limited prior literature and regulators' concerns identify client and engagement characteristics that might be associated with increased challenges in GGAs. Our first hypothesis proposes:

- H1:** The likelihood of coordination/communication challenges in managing GGAs increases in the presence of client/engagement characteristics associated with greater complexity, including: (H1a) larger size; (H1b) more complex global structure; and (H1c) greater cultural and language barriers.

Coordination and Communication Strategies

The management literature proposes three ways to improve success in coordinating distributed teams: (1) *tacit coordination*; (2) *modularization*; and (3) *ongoing communication* (see Figure 1). Modularization and ongoing communication are well-established strategies in organization theory (e.g., March and Simon 1958; Thompson 1967; Tushman and Nadler 1978; Orton and Weick 1990; Sanchez and Mahoney 1996; Baldwin and Clark 2000), while tacit coordination has more recently emerged in the strategy literature as a means of addressing coordination challenges arising from interdependence (see Srikanth and Puranam 2011). While the management literature promotes them as theoretically appealing, and finds some effectiveness in simple contexts (e.g., student teams, or offshoring of routine tasks such as back office services and call centers), extension of these findings to the more complex GGA setting is uncertain.

FIGURE 1
Coordination and Communication Strategies

Tacit Coordination	Modularization	Ongoing Communication
<i>Leverage common ground through shared experience and knowledge</i>	<i>Efforts to reduce interdependencies through advance coordination of work</i>	<i>Content, method, and ease of communication during the engagement</i>
Knowledge: <ul style="list-style-type: none"> • U.S. regulatory environment, GAAP, GAAS, and industry standard knowledge Experience: <ul style="list-style-type: none"> • Tenure of the group and component audit leaders • Previous experience working together • Turnover of component audit staff • Cultural training Observability: <ul style="list-style-type: none"> • U.S. tour for component auditor • Secondment to component location for group auditor • Explaining implicit local contextual features influencing decision making 	<ul style="list-style-type: none"> • Tailoring component audit instructions and work • Standardized procedures (or a plan) for interactions • Component auditor scopes work to be performed 	Content: <ul style="list-style-type: none"> • Kickoff meeting • Discussion of written instructions • Fraud brainstorming meeting Processes: <ul style="list-style-type: none"> • Availability and use of technologies/ electronic tools to share work-in-process • Guidance on how to work remotely • On-site visits • Synchronous communication (e.g., telephone or web conferencing).

This figure illustrates the three coordination/communication strategies of focus in our analysis.

Tacit Coordination

First, interdependent teams may alleviate coordination challenges through tacit coordination; i.e., establishing or leveraging a common ground of shared experiences and known practices (Daft and Lengel 1986; Srikanth and Puranam 2011).¹⁰ While information and knowledge transfer are slower in geographically distributed teams (Walther 1995; Zack and McKenney 1995), tacit coordination should improve reciprocal predictability of action by increasing knowledge of the work and its context across teams. However, PCAOB inspection results imply concern in this area, highlighting engagements in which the component auditor, “lacked the necessary industry experience or knowledge of PCAOB and SEC rules and standards . . . and the applicable financial reporting framework to perform the work requested” (PCAOB 2016a, 18).

In order to effectively participate in the audit of a U.S. domiciled entity, teams need a baseline of knowledge of the U.S. regulatory environment, as well as GAAP, GAAS, and industry standards (e.g., PCAOB 2016a). Common ground can also be improved by seasoned group and component auditors (i.e., those with several years of experience on the engagement) who have more shared engagement-specific knowledge to leverage, as well as knowledge of each other’s work practices. Training focused on cultural differences or temporary assignment of component (group) auditors to the U.S. (local) firm may also increase common understanding of contextual features (Straus and Olivera 2000; Sole and Edmondson 2002; Mäkelä 2007; Srikanth 2007; Srikanth and Puranam 2011). Even if staffing and training interventions are not possible, distributed teams may engage in efforts to help each other understand the remote decision-making process by making local contextual features explicit to the other party (Srikanth and Puranam 2011). In sum, the literature identifies a number of ways in which GGA participants might increase reciprocal predictability of action through building a common ground of relevant knowledge.

Modularization

A second strategy is to “modularize” activities in advance, such that the need for later coordination is minimized (Sanchez and Mahoney 1996; MacDuffie 2007). Modularization implies “adhering to an operating procedure that specifies what each must do individually so that their joint actions are coordinated,” increasing reciprocal predictability of actions (Srikanth and Puranam

¹⁰ Prior auditing research finds that knowledge and experience improve performance of individuals (Libby and Luft 1993). Relatively few studies examine effects of auditor knowledge or experience on teams (Gardner, Gino, and Staats 2012; Dennis and Johnstone 2017). This study extends the literature by considering the influence of knowledge and experience of disparate auditors from legally separate firms, as assessed by their U.S. counterparts.

2011, 853). Modularization in a GGA can be accomplished by: (1) tailoring component instructions and/or organizing local fieldwork so that procedures can be performed without reliance on the group auditor; (2) developing standardized plans or procedures for future interactions; and/or (3) allowing the component auditor to scope (i.e., plan) the work to be performed over the component.¹¹ Allowing the component auditor to scope the work may improve efficiencies for the component auditor, but it could also reduce effectiveness if risks pertinent to the overall GGA are not properly addressed (Sunderland and Trompeter 2017).

Prior research supports effectiveness of modularization in distributed teams for well-defined business activities such as mortgage processing, in which the “architecture” of the process (Srikanth and Puranam 2011, 854) is well understood. Extension of these results to the auditing setting is an empirical question for several reasons. First, auditing is an iterative process, as the audit plan is continually revised to address new information. This may make modularization less successful in GGAs than in more predictable environments. Second, component auditors are relatively autonomous (i.e., separate legal entities with predominately local clientele, directing their own local work). Prior research shows that attempts to standardize operating procedures can de-motivate generally autonomous agents (e.g., Puranam and Srikanth 2007). Third, successful modularization requires that the component auditor understand and comply with the group auditor’s instructions or plan. While some studies suggest that work practices and knowledge management apply across global networks (e.g., Carson 2009; Dowling 2009), others show that application of firm practices varies (e.g., Barrett et al. 2005; Saito and Takeda 2014), and standardization may not improve audit outcomes (e.g., Boland, Brown, and Dickins 2017). These features suggest that successful modularization may be more difficult in auditing than in other business settings.

Ongoing Communication

Third, firms can establish common understanding as the audit proceeds through *ongoing communication*; i.e., constant updating regarding the work process. Organization theory suggests that ongoing communication is most needed in contexts where “extensive specification” of coordination procedures in advance is more difficult (Srikanth and Puranam 2011, 854). Auditing regulators provide evidence of problems with ongoing communication in practice, including significant variation in group auditors’ communication practices and the success of those practices (IAASB 2013; PCAOB 2016a).

Auditing standards (ISA 600) contain some requirements regarding the *content* of communication between teams, requiring the group auditor to include the component auditor in key meetings (e.g., engagement kickoff, discussion of instructions, or fraud brainstorming), or communicate results of those meetings. However, the extent to which each occurs in practice is unknown. ISA 600 also requires that group auditors specify the information to be reported back by components. While directly viewing each other’s work would provide better information (Karsenty 1999; Fussell, Kraut, and Siegel 2000; Gutwin, Penner, Schneider 2004), summary documentation is often used, as legal restrictions prohibit workpaper sharing across countries.¹²

Regarding communication *processes*, prior research suggests that technologies that facilitate remote collaboration and shared work in process can increase reciprocal predictability of action (Murthy and Kerr 2004; Srikanth and Puranam 2011). However, system acceptance may vary based on differences in local team/firm consensus (Dowling 2009). Also, media richness theory suggests that face-to-face communication provides more information cues, increasing reciprocal predictability by promoting mutual understanding between teams (e.g., Daft and Lengel 1986; Agoglia, Brazel, Hatfield, and Jackson 2010; Bennett and Hatfield 2016). However, cost and time constraints may limit face-to-face communication on GGAs (Barrett et al. 2005). If so, synchronous communication methods (e.g., telephone or web conferencing) can improve reciprocal predictability, providing a conversational flow and more immediate feedback (Montoya-Weiss, Massey, and Song 2001; Cummings, Espinosa, and Pickering 2009).

In summary, the organization theory and management literatures propose three strategies (tacit coordination, modularization, and ongoing communication) that could improve coordination and communication in the global group audit by increasing reciprocal predictability of action, mitigating the influence of client and engagement characteristics on interdependent work. As we note previously, prior studies examining these strategies in business contexts have only considered structured processes (e.g., call centers). Although it is uncertain whether previous findings in these simpler contexts will generalize to the more fluid and regulated context of auditing, we propose based on prior literature that each of these strategies will reduce challenges in the GGA setting:

H2: Coordination and communication strategies will reduce challenges experienced in managing GGAs: (H2a) tacit coordination; (H2b) modularization; and (H2c) ongoing communication.

¹¹ The scope of the audit refers to designing/determining the type of work to be performed. The group auditor may elect to design/determine the type of work to be performed over the component, or have the component auditor design/determine the type of work on the group auditor’s behalf (IFAC 2007).

¹² For instance, Sunderland and Trompeter (2017) note that the China Accounting Archives Management Measure Article 18 prohibits the removal of audit workpapers outside the People’s Republic of China, while in Belgium component auditors are prohibited from providing workpapers to non-EU group auditors.

In addition to the above hypotheses, we also test whether the influence of coordination/communication strategies is contingent on client/engagement complexity. We predict that the influence of coordination/communication strategies in reducing challenges will be greater when complexity is higher. Implementing such strategies (e.g., developing and deploying new technologies; investing in personnel to ensure continuity and training) is expensive. Firms are unlikely to invest these resources if they only work in simple audits. Also, it is likely that the effects of strategies will be observed when they are most needed, i.e., when risk of coordination failure is high. In contrast, improvement may be less detectable for simple audits, because teams can overcome coordination/communication challenges without them. While we predict greater reduction in the likelihood of challenging engagements associated with each strategy for high complexity GGAs, there is tension in this expectation as high complexity might lead to intractable problems. If so, we might observe mitigation of challenges by the strategies only when complexity is low. Our third hypothesis is:

H3: Coordination and communication strategies will mitigate the influence of higher client/engagement complexity on the likelihood of challenges experienced in managing GGAs. Those strategies are: (H3a) tacit coordination; (H3b) modularization; and (H3c) ongoing communication.

IV. METHOD

Data and Participants

To investigate GGAs, we used an experiential questionnaire to solicit information from highly experienced audit professionals at multiple Big 4 firms on engagements in which they, as members of the group engagement team, relied on auditors at foreign locations to perform audit work over components of the consolidated financial statements of a U.S.-based entity.¹³ The Center for Audit Quality distributed two versions of the questionnaire to senior managers with multiple global group audit experiences, identified by their firms as potential participants. One asks auditors to recall an engagement where they encountered significant challenges, while the other asks about an engagement in which any challenges encountered were of little significance.¹⁴ Within the selected engagements, the questionnaire asks participants to focus on a single component that best represents the level of challenges experienced. This design follows previous studies in auditing employing a retrospective focus on specific engagement experiences, avoiding “leading” questions to promote accurate recall and reporting (e.g., Gibbins, Salterio, and Webb 2001; Nelson, Elliott, and Tarpley 2002; Cannon and Bedard 2017).

The total sample comprises 190 global group audit experiences from 148 senior managers, of which approximately 85 (15 percent) were senior managers (managers) at the time of the global group audit experience.¹⁵ Complete data on variables used in our analyses are available for 149 observations (75 challenging and 74 non-challenging). We remove two observations for which the component auditor is not a member of the same global network as the group auditor.¹⁶ The majority of experiences (68.0 percent) occurred less than a year prior to data collection, while 16.3 percent occurred one or two years prior. The recency of sample experiences should improve recall of engagement circumstances (e.g., Bradburn, Rips, and Shevell 1987). On average, the GGAs involve about nine components, ranging from 1 to 54 components. Eighty-six percent of clients in the sample are SEC registrants, in the manufacturing (30.6 percent), technology (21.8 percent), retail (7.5 percent), consumer products (6.8 percent), financial services (6.1 percent), and energy/utilities (6.1 percent) industries.

Questionnaire Design and Collection Procedures

To develop the instrument, we conducted a series of interviews with senior managers from several of the participating firms, and solicited additional feedback from audit partners. The final questionnaire reflects the feedback of these professionals,

¹³ Approval for this study was granted by our University’s Institutional Review Board (IRB).

¹⁴ Data provided through the CAQ and participating firms indicate that 74.51 percent of the auditors solicited for the study completed the questionnaire, and that response rates do not differ between versions of the questionnaire.

¹⁵ Participants completed the questionnaire in their offices under no time constraint, with access to workpapers if needed. They described one or two global group audit experiences based on the preference of their firm; 55.8 percent described a single experience, and the remaining 44.2 percent described both a challenging and a non-challenging experience. Firms preferring to have participants describe two global group audit experiences distributed challenging/non-challenging versions of the questionnaire in random order. We investigated whether the greater volume of information required for two-experience participants caused more missing data, finding no difference from single-experience participants in the final sample. To ensure anonymity, we did not collect identifying information, including identity of the audit firm.

¹⁶ While comparing within-network to out-of-network GGAs is interesting and important, the few out-of-network component auditors discussed in our sample prevent that comparison. In contrast, Carson, Simnett, Trompeter, and Vanstraelen (2017) report only 19 percent of group audits led by Australian teams involve component auditors that are all within-network. One factor contributing to this difference is our focus on Big 4 firms, which are more likely than smaller firms to have network affiliates located where components are domiciled.

the literature on geographically distributed work, and ISA 600. In selecting a global group audit experience, the questionnaire instructs participants to choose a continuing audit (not a first-year engagement), where work performed by the component auditor was fairly extensive. Following this general prompt, the questionnaire asks them to choose an engagement for which they are familiar with how their team coordinated and communicated with the component auditors, and how the component engagement teams' work was integrated into the overall audit. Within the selected engagement, the questionnaire asks participants to focus responses on a single component that best represents the engagement's challenging or non-challenging nature, respectively. In the "challenging" version, the questionnaire instructs participants to choose an engagement where significant coordination/communication challenges were encountered, exemplifying at least one of several broad types derived from concerns of the PCAOB and the firms providing data. These include difficulties related to the execution of the component audit work, variation in the risk assessed or the quality of work performed by the component auditor, and issues of timeliness.¹⁷ To provide ample time to consider the criteria, choose a relevant engagement, and consider the details of that experience through recall or search of workpapers, a firm liaison sent a letter on our behalf to each participant several days in advance of sending the questionnaire, explaining the study.

Variables

To address our constructs of interest, we relied on prior research and input from participating firms to identify both client/engagement characteristics likely to influence reciprocal predictability, as well as potentially mitigating strategies. We describe these measures by construct in Table 1, but do not discuss them for efficiency of presentation.¹⁸ As many of the individual measures are correlated,¹⁹ we used polychoric factor analysis to develop variables representing the latent constructs (e.g., [Dragow 1988](#); [Dorantes, Li, Peters, and Richardson 2013](#); [Harris, Petrovits, and Yetman 2015](#)).

Client and Engagement Characteristics

Factor analysis yields three client/engagement complexity factors with eigenvalues greater than 1.0, together explaining 78.1 percent of the variance of original measures. Using factor loadings of at least 0.40 (which naturally differentiates loadings and is consistent with [Harris et al. 2015](#)), we interpret these factors as: (1) *SIZE* (23.5 percent of variance), including greater client revenues and SEC registrant status; *STRUCTURE* (24.4 percent), including a component auditor statutory audit and greater numbers of component auditors; and (3) *BARRIERS* (30.2 percent) including greater language and cultural barriers, and lack of a sub-component structure (i.e., direct communication between the group auditor and the components performing the work).

Tacit Coordination

For tacit coordination, five factors with eigenvalues over 1.0 explain 70.6 percent of the variance of the original measures. Variables loading positively on *TACIT_CA_EXPERIENCE* (12.3 percent of variance explained) include engagement experience of the component audit manager and the extent to which group and component auditors have previously worked together. For *TACIT_CA_STABILITY* (11.1 percent), the extent to which the component team did not change from the prior year loads positively. For *TACIT_CA_EXPAT* (10.0 percent), a U.S. expatriate on the component auditor team loads positively. With respect to *TACIT_CA_KNOWLEDGE* (25.4 percent), variables loading positively include extent of the component auditor's knowledge of U.S. GAAP, GAAS, regulatory environment, and industry. For *TACIT_GA_EXPERIENCE* (11.8 percent) group partner experience loads positively, while cultural training loads negatively.²⁰ The opposing signs within this factor suggest that cultural training is more often used by less experienced group partners, although the mean of cultural training is low (4.1 percent).

¹⁷ Consistent with PCAOB concerns and our theoretical base, we sought to focus participants' engagement selections on challenges in coordination/communication. Results of preliminary verbal protocols and pretests demonstrated that providing a list was helpful in directing the scope of this study toward such challenges (rather than issues extraneous to our theories such as sudden personnel changes or disagreements about fee allocation). The challenge types were developed with advice from partners at the firms providing data to cover non-industry-specific issues addressed in ISA 600 and key aspects of audit quality. This list is unlikely to substantially limit coverage of audit processes, as the items relate to performance of all phases of an audit.

¹⁸ Table 1 presents the variables underlying the polychoric factors used in Models 1–4 and the control variable. The table excludes five measures that did not load on the factors used in the models, including: complexity of the audit work, extent of guidance provided on managing remote work, frequency of communication, extent of spontaneous communication, and free exchange of information between the group and component auditor.

¹⁹ For instance, significantly correlated variables include: *LANG_BARRIERS* and *CULTURAL_BARRIERS* (0.67); *CA_KNOW_GAAP* and *CA_KNOW_GAAS* (0.86); *TAILORED_INSTRUCTIONS* and *TAILORED_WORK* (0.58); and *TECHNOLOGY_AVAILABLE* and *ELECTRONIC_TOOLS_USE* (0.54).

²⁰ Cultural training also loads negatively on *TACIT_CA_EXPERIENCE*. This suggests that group auditors are more likely to receive cultural training when component auditors are less experienced.

TABLE 1
Variable Definitions and Descriptive Statistics (Means and Std. Dev)

Panel A: Client and Engagement Characteristics—Mean (Std. Dev) or % = 1

Variable Name	Variable Description	Total Sample	Challenging (n = 74)	Non-Challenging (n = 73)	t or Z
REVENUE	Company annual revenues; 1 (<= \$25 million) to 5 (> \$5 billion)	4.1 (1.0)	4.2 (0.9)	3.9 (1.1)	1.8**
SEC_REGISTRANT	1 = client is an SEC registrant; 0 = otherwise	86.4%	85.1%	87.7%	-0.4
NUMBER_COMPONENTS	Number of components involved in this global engagement	8.9 (8.6)	10.7 (9.8)	7.1 (6.8)	2.7***
SUPERV_COMPONENT	1 = component with a number of sub-components under its supervision; 0 = otherwise	8.8%	6.8%	11.0%	-0.9
SUB_COMPONENT	1 = component auditor reported indirectly to the group auditor through another component engagement team; 0 = otherwise	9.5%	9.5%	9.6%	-0.3
OTHER_TEAM	1 = team other than the component auditor performed a portion of the audit work; 0 = otherwise	51.0%	52.7%	49.3%	0.4
STATUTORY_AUDIT	1 = component auditor performed a statutory audit in addition to the work completed for the group audit; 0 = otherwise	87.1%	90.5%	83.6%	1.3
LANG_BARRIERS	Extent of language barriers between group and component auditors; 0 ("Not At All") to 11 ("Very High")	2.9 (2.8)	3.1 (3.0)	2.5 (2.5)	1.3*
CULTURAL_BARRIERS	Extent of cultural barriers between the group and component auditors; 0 ("Not At All") to 11 ("Very High")	3.9 (2.7)	4.1 (2.7)	3.7 (2.7)	0.8

Panel B: Tacit Coordination

Variable Name	Variable Description	Total Sample	Challenging (n = 74)	Non-Challenging (n = 73)	t or Z
CA_KNOW_REG_ENV	Component team understanding of U.S. regulatory oversight; 1 ("Very Low") to 11 ("Very High")	7.2 (2.2)	6.7 (2.0)	7.7 (2.2)	-2.9***
CA_KNOW_GAAP	Component team understanding of U.S. GAAP; 1 ("Very Low") to 11 ("Very High")	8.3 (1.8)	8.0 (1.8)	8.6 (1.7)	-2.2**
CA_KNOW_GAAS	Component team's understanding of U.S. GAAS; from 1 ("Very Low") to 11 ("Very High")	8.1 (1.7)	7.7 (1.7)	8.6 (1.7)	-3.0***
CA_KNOW_INDUSTRY	Component engagement team understanding of the industry; from 1 ("Very Low") to 11 ("Very High")	9.0 (1.6)	8.7 (1.7)	9.4 (1.5)	-2.7***
CA_MGR_EXPERIENCE	Years of component audit manager engagement experience	8.0 (3.4)	7.4 (3.6)	8.6 (3.2)	-2.1**
CA_PTR_EXPERIENCE	Years of component audit partner engagement experience	3.6 (2.2)	3.5 (2.3)	3.8 (2.1)	-0.9

(continued on next page)

TABLE 1 (continued)

Variable Name	Variable Description	Total Sample	Challenging (n = 74)	Non-Challenging (n = 73)	t or Z
GA_MGR_EXPERIENCE	Years of group audit manager engagement experience	4.2 (2.8)	4.0 (2.8)	4.4 (2.8)	-0.8
GA_PTR_EXPERIENCE	Years of group audit partner engagement experience	3.5 (2.5)	3.7 (2.7)	3.3 (2.4)	1.0
WORK_TOGETHER_PRIOR	Extent to which group and component teams previously worked together on this or other engagements; 0 ("Not At All") to 11 ("Very High")	7.2 (2.9)	6.6 (3.1)	7.8 (2.6)	-2.6***
CULTURAL_TRAINING	1 = group team received training on cultural differences prior to the engagement commencing; 0 = otherwise	4.1%	4.1%	4.1%	0.2
CA_STABILITY	1 = component team did not include new staff; 0 = otherwise	64.6%	54.1%	75.3%	-2.7***
CA_US_TOUR	1 = component team included a local auditor who completed a long-term U.S. assignment in the last five years; 0 = otherwise	21.1%	17.6%	24.7%	-1.1
CA_US_EXPAT	1 = component team included a member of the U.S. firm (e.g., secondment or expatriate); 0 = otherwise	19.7%	18.9%	20.5%	-0.2
DECISIONS_EXPLAINED	Extent that the component auditor aided the group auditor in understanding decisions in planning, executing and concluding field work; from 0 ("Not at All") to 11 ("Very High")	7.4 (2.0)	7.0 (2.0)	7.7 (1.9)	-2.0**

Panel C: Modularization

Variable Name	Variable Description	Total Sample	Challenging (n = 74)	Non-Challenging (n = 73)	t or Z
TAILORED_INSTRUCTIONS	Extent that initial instructions were tailored to minimize need for interactions between the group and component auditor; 0 ("Not At All") to 11 ("Very High")	7.9 (2.0)	7.7 (2.1)	8.1 (1.8)	-1.5*
TAILORED_WORK	Extent that component work (i.e., procedures) was tailored to minimize need for interactions between the group and component auditor; 0 ("Not At All") to 11 ("Very High")	7.0 (2.2)	6.7 (2.2)	7.3 (2.3)	-1.7**
PLANNED_INTERACTIONS	Extent that initial engagement plan stipulated the nature/timing of substantially all interactions between group and component auditor; 0 ("Not at All") to 11 ("Very High")	8.4 (1.8)	8.3 (1.8)	8.5 (1.8)	-0.6
CA_SCOPED	1 = Component audit procedures were scoped (i.e., designed/determined) by the component team; 0 = otherwise	10.9%	8.1%	13.7%	-1.1

(continued on next page)

TABLE 1 (continued)

Panel D: Ongoing Communication

Variable Name	Variable Description	Total Sample	Challenging (n = 74)	Non-Challenging (n = 73)	t or Z
<i>KICKOFF_MEETING</i>	1 = component auditor participated with the group auditor in the kick-off or planning meeting; 0 = otherwise	72.1%	74.3%	69.9%	0.6
<i>INSTRUCTIONS_DISCUSSION</i>	1 = component auditor participated with the group auditor in discussions of the audit plan/instructions; 0 = otherwise	79.6%	74.3%	84.9%	-1.6*
<i>FRAUD_BRAINSTORMING</i>	1 = component auditor participated with the group auditor in the fraud brainstorming meeting; 0 = otherwise	54.4%	50.0%	58.9%	-1.1
<i>TECHNOLOGY_AVAILABLE</i>	Extent to which technologies were available to communicate information, e.g., shared platforms, databases, web portals, or dedicated intranet sites; from 0 ("Not at All") to 11 ("Very High")	5.1 (3.6)	5.2 (3.5)	5.1 (3.7)	0.2
<i>ELECTRONIC_TOOLS_USE</i>	Extent to which electronic tools were used to enable remote collaboration, e.g., Net Meeting, instant messaging, application sharing; from 0 ("Not at All") to 11 ("Very High")	4.2 (3.1)	4.3 (3.0)	4.1 (3.2)	0.5
<i>ONSITE_VISIT</i>	1 = group audit manager or partner visited the component audit location to review last year's work papers, or to plan and execute the current audit; 0 = otherwise	57.8%	58.1%	57.5%	0.1
<i>SYNCHRONOUS_VALUED</i>	1 = most valued communication method was synchronous; 0 = otherwise	73.5%	78.4%	68.5%	1.4*
<i>SYNCHRONOUS_FREQ</i>	1 = most frequent communication method was synchronous; 0 = otherwise	10.9%	9.5%	12.3%	-0.6

Panel E: Control Variable

Variable Name	Variable Description	Total Sample	Challenging (n = 74)	Non-Challenging (n = 73)	t or Z
<i>AUDITPLAN_CHANGE</i>	Significance of changes in scoping, audit approach, materiality, or procedures; from 0 ("Not At All") to 11 ("Very High")	1.9 (3.2)	2.4 (3.5)	1.4 (2.7)	1.8**

***, **, * Indicate significance at $p < 0.01$, 0.05 , and 0.10 , respectively.

This table presents descriptive statistics on variables underlying the polychoric factors used in Models 1–4 as well as a control variable, for the sample of 147 observations with complete data. Differences between challenging and non-challenging components are tested using t- (Z-) statistics for continuous (dichotomous) variables.

Modularization

Factor analysis of modularization variables yields one factor with an eigenvalue over 1.0, explaining 93.8 percent of the variance of the original measures. The extent to which tailored instructions, tailored work, and planned interactions are used within the engagement to minimize interdependencies all load positively on *MODULARIZATION*.

Ongoing Communication

For ongoing communication, three factors with eigenvalues over 1.0 explain 79.9 percent of the variance of the original measures. *ONGOING_CONTENT* (35.4 percent of variance explained) includes positive loadings for the extent to which the group auditor involves the component auditor in the kickoff meeting, discussion of instructions, and fraud brainstorming; and when the communication method most valued is synchronous. *ONGOING_ELECTRONIC* (25.5 percent) includes positive loadings for the extent to which the group team received guidance in how to work remotely with component auditors, and the availability and use of electronic tools on the engagement. For *ONGOING_FTF* (19.0 percent), the extent of synchronous communication methods use and face-to-face meetings between teams load positively.²¹

Models

Model 1 is a main effects probit model estimated with robust standard errors clustered on participant, testing overall associations of client/engagement and strategy variables with the probability that an engagement is identified as a highly challenging global group audit. H1a–H1c predict positive coefficients on client/engagement complexity factors, as theory suggests that complexity reduces reciprocal predictability of action (increasing challenges). H2a–H2c predict negative coefficients on coordination/communication strategy factors, as they should increase reciprocal predictability (decreasing challenges).²²

$$\begin{aligned}
 CHALLENGING = & \beta_0 + \beta_1 SIZE + \beta_2 STRUCTURE + \beta_3 BARRIERS + \beta_4 TACIT_CA_EXPERIENCE \\
 & + \beta_5 TACIT_CA_STABILITY + \beta_6 TACIT_CA_EXPAT + \beta_7 TACIT_CA_KNOWLEDGE \\
 & + \beta_8 TACIT_GA_EXPERIENCE + \beta_9 MODULARIZATION + \beta_{10} ONGOING_CONTENT \\
 & + \beta_{11} ONGOING_ELECTRONIC + \beta_{12} ONGOING_FTF + \{Control\ Variables\} + \varepsilon \quad (1)
 \end{aligned}$$

Models 2–4 are interaction models, testing whether each strategy mitigates the effects of higher levels of client/engagement complexity on *CHALLENGING*. We estimate a separate model for each client/engagement characteristic: Model 2 measures [complexity factor] as *SIZE*, Model 3 as *STRUCTURE*, and Model 4 as *BARRIERS*. In each model, the client/engagement characteristic of interest is interacted with each strategy, and other client/engagement characteristics are retained as main effects. In addition to predictions in H1a–H1c and H2a–H2c as noted above, support for H3a–H3c implies negative coefficients on the interaction terms, consistent with greater benefit of strategies in reducing challenges on particularly complex engagements, when the threat of coordination failure is greatest.

$$\begin{aligned}
 CHALLENGING = & \beta_0 + \beta_1 SIZE + \beta_2 STRUCTURE + \beta_3 BARRIERS + \beta_4 TACIT_CA_EXPERIENCE \\
 & + \beta_5 [complexity\ factor] * TACIT_CA_EXPERIENCE + \beta_6 TACIT_CA_STABILITY \\
 & + \beta_7 [complexity\ factor] * TACIT_CA_STABILITY + \beta_8 TACIT_CA_EXPAT \\
 & + \beta_9 [complexity\ factor] * TACIT_CA_EXPAT + \beta_{10} TACIT_CA_KNOWLEDGE \\
 & + \beta_{11} [complexity\ factor] * TACIT_CA_KNOWLEDGE + \beta_{12} TACIT_GA_EXPERIENCE \\
 & + \beta_{13} [complexity\ factor] * TACIT_GA_EXPERIENCE + \beta_{14} MODULARIZATION \\
 & + \beta_{15} [complexity\ factor] * MODULARIZATION + \beta_{16} ONGOING_CONTENT \\
 & + \beta_{17} [complexity\ factor] * ONGOING_CONTENT + \beta_{18} ONGOING_ELECTRONIC \\
 & + \beta_{19} [complexity\ factor] * ONGOING_ELECTRONIC + \beta_{20} ONGOING_FTF \\
 & + \beta_{21} [complexity\ factor] * ONGOING_FTF + \{Control\ Variables\} + \varepsilon \quad (2)–(4)
 \end{aligned}$$

²¹ A methodological concern is that a certain strategy is more likely to be adopted on engagements with a specific type or level of client/engagement complexity. If so, we should observe a significant positive correlation between client/engagement characteristic and strategy factor. However, only three (of the possible 27) correlations are significantly positive and one is significantly negative; the highest numerical value is 0.22. Thus, any effect of multicollinearity on model results should be minimal.

²² All models include control variables for the auditor’s judgment of the extent of changes in the audit (*AUDITPLAN_CHANGE*) and the client industry.

V. RESULTS

Descriptive Information on the Nature of Challenges Experienced in Sample Engagements

Prior to discussing our main results, we present the broad types of coordination/communication challenges (derived from concerns of the PCAOB and sponsoring firms) exemplified in participants' choice of engagement. Untabulated results show that challenges in these components were more than moderately important to the overall global group audit (mean = 7.0, where 1 = very low and 11 = very high). On average, 29.6 percent of all components on sample GGAs posed significant challenges, and the challenges were moderately anticipated (mean = 5.6). Concerning the nature of challenges, participants noted that they often related to *execution* of audit work, including obtaining clarity around documentation/open items (52.7 percent), communicating/coordinating the audit strategy, updates, information (52.7 percent), designing/performing additional procedures (33.7 percent), and appropriately involving the group auditor (25.7 percent). In 12.2 percent, challenges involved variation in risks assessed by the component and group auditors. In 31.1 percent, group auditors report that the work performed by the component auditors did not always comply with instructions. *Timing* challenges were also prevalent, as non-timely communication of exceptions, significant matters, internal control issues, and non-timely completion of audit work represent 41.9 and 58.1 percent of challenges (respectively). However, subsequent discovery of information that affects the group audit was rare (6.8 percent).

Results of Multivariate Models

As a preliminary analysis, we first estimate Model 1, a main effects probit model of *CHALLENGING* with client/engagement and strategy factors. Results in Table 2, Column A show that both *SIZE* and *STRUCTURE* have the expected positive signs ($p < 0.10$ and $p < 0.05$, respectively), but *BARRIERS* does not; this supports H1a and H1b, but not H1c. The only strategies significantly associated with lower overall probability of a challenging engagement are tacit coordination factors related to component auditors: *TACIT_CA_EXPERIENCE*, *TACIT_CA_STABILITY*, and *TACIT_CA_KNOWLEDGE* (all at $p < 0.01$). The significance of three tacit coordination factors provides partial support for H2a, but H2b and H2c are not supported in the main effects model. These results thus suggest that overall, engagements identified as challenging tend to involve clients that are large SEC registrants with a greater number of components and local statutory audit requirements. Further, Model 1 suggests that the only strategy effective in reducing the overall probability of challenges is consistent employment of an experienced, knowledgeable component auditor team. Main effects findings also show that strategies often employed by the profession (modularization of work, increasing interaction between teams through meetings, and availability/use of electronic tools) do not reduce challenges overall.

Interactions of Strategies with Company Size/Regulatory Status

Table 2, Column B shows results of Model 2, testing whether the effects of strategies are contingent on the level of *SIZE* (higher revenues and SEC registrant status). The main effect for *TACIT_CA_KNOWLEDGE* remains negative and significant ($p < 0.01$) and its associated interaction is insignificant, implying that greater component auditor knowledge of U.S. GAAS, GAAP and industry norms reduces challenges across the range of *SIZE*. However, negative and significant interactions with *TACIT_CA_EXPERIENCE* and *TACIT_CA_EXPAT* show that effects of these strategies have a greater mitigating effect on challenges as size increases, consistent with H3a. Figure 2, Panel A illustrates the pattern of the interaction with *TACIT_CA_EXPERIENCE*, showing that for greater *SIZE*, the predicted probability of a challenging audit decreases from 0.76 to 0.33 as component auditor experience increases from lower to higher. For lower *SIZE*, the predicted probabilities do not differ by component auditor experience. In contrast, Figure 2, Panel B shows a disordinal interaction of size and component auditor expatriate experience. For greater *SIZE*, the predicted probability of a challenging audit decreases from 0.69 to 0.40 as the level of U.S. expatriate involvement increases. In contrast, for lower *SIZE* this pattern reverses; higher *CA_US_EXPAT* is associated with a *higher* predicted probability of challenges (0.73 versus 0.33).²³ Contrary to H3, Model 2 results also show two significant positive interactions, with *TACIT_CA_STABILITY* and *MODULARIZATION*, suggesting that these factors only reduce challenges as *SIZE* decreases. We discuss these unexpected findings in the section VI.

Taken together, results of Model 2 imply that greater component auditor knowledge is associated with lower probability of challenging group audits, regardless of client size/regulatory status. When these complexity characteristics are higher, both engagement experience of component audit team leaders and expatriate experience on the component team also help mitigate

²³ The result for low *SIZE* may not be reliable, as there are only three expatriates involved on engagements below the mean of *SIZE*, in contrast to 26 above the mean of *SIZE*.

TABLE 2
Client and Engagement Characteristics and the Role of Mitigating Strategies in Distinguishing Challenging versus Non-Challenging Global Group Audits

Client and Engagement Characteristics Measured as:

	A. Main Effects (Model 1) Coeff. (z)	B. Interactions with Size (Model 2) Coeff. (z)	C. Interactions with Structure (Model 3) Coeff. (z)	D. Interactions with Barriers (Model 4) Coeff. (z)
Test Variables				
SIZE (+)	0.25* (1.60)	-0.02 (-0.11)		
STRUCTURE (+)	0.44** (2.25)		0.57*** (2.58)	
BARRIERS (+)	0.02 (0.15)			0.08 (0.52)
TACIT_CA_EXPERIENCE (-)	-0.39*** (-3.16)	-0.41*** (-2.75)	-0.40*** (-2.94)	-0.38*** (-3.08)
[complexity factor] * TACIT_CA_EXPERIENCE (-)		-0.39** (-2.13)	-0.17 (-1.05)	0.11 (0.76)
TACIT_CA_STABILITY (-)	-0.29*** (-2.40)	-0.49*** (-3.56)	-0.31*** (-2.33)	-0.28** (-2.29)
[complexity factor] * TACIT_CA_STABILITY (-)		0.57^ (1.90)	-0.15 (-0.76)	-0.11 (-0.72)
TACIT_CA_EXPAT (-)	-0.03 (-0.20)	0.18 (1.15)	-0.06 (-0.44)	-0.04 (-0.31)
[complexity factor] * TACIT_CA_EXPAT (-)		-0.77*** (-2.66)	0.01 (0.07)	-0.07 (-0.04)
TACIT_CA_KNOWLEDGE (-)	-0.33*** (-2.68)	-0.39*** (-2.72)	-0.45*** (-3.32)	-0.35*** (-2.71)
[complexity factor] * TACIT_CA_KNOWLEDGE (-)		-0.09 (-0.41)	0.05 (0.19)	0.04 (0.22)
TACIT_GA_EXPERIENCE (-)	0.09 (0.71)	0.07 (0.45)	0.08 (0.43)	0.12 (0.82)
[complexity factor] * TACIT_GA_EXPERIENCE (-)		0.11 (0.38)	0.03 (0.08)	-0.11 (-0.57)
MODULARIZATION (-)	-0.14 (-1.01)	-0.21 (-1.25)	-0.08 (-0.51)	-0.09 (-0.57)
[complexity factor] * MODULARIZATION (-)		0.52^^ (2.24)	-0.65** (-1.83)	-0.07 (-0.45)
ONGOING_CONTENT (-)	0.00 (0.02)	0.04 (0.22)	0.04 (0.25)	0.10 (0.62)
[complexity factor] * ONGOING_CONTENT (-)		-0.29 (-1.05)	-0.60** (-1.95)	-0.25* (-1.42)
ONGOING_ELECTRONIC (-)	0.09 (0.67)	0.16 (1.09)	0.12 (0.87)	0.07 (0.55)
[complexity factor] * ONGOING_ELECTRONIC (-)		-0.16 (-0.74)	0.06 (0.26)	-0.34** (-1.99)
ONGOING_FTF (-)	-0.15 (-0.85)	-0.09 (-0.48)	-0.16 (-0.97)	-0.20 (-1.01)
[complexity factor] * ONGOING_FTF (-)		-0.22 (-0.57)	-0.11 (-0.35)	0.22 (0.81)

(continued on next page)

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TABLE 2 (continued)

Client and Engagement Characteristics Measured as:

	A. Main Effects (Model 1) Coeff. (z)	B. Interactions with Size (Model 2) Coeff. (z)	C. Interactions with Structure (Model 3) Coeff. (z)	D. Interactions with Barriers (Model 4) Coeff. (z)
Control Variables				
SIZE (+)			0.27* (1.54)	0.50*** (1.69)
STRUCTURE (+)		0.37** (1.71)		0.28** (2.42)
BARRIERS (+)		0.05 (0.28)	-0.01 (-0.05)	
AUDITPLAN_CHANGE (+)	0.07** (1.99)	0.09** (2.13)	0.08** (2.03)	0.08** (2.12)
{Industry Indicators}				
Intercept	-0.22 (-0.90)	-0.13 (-0.48)	-0.27 (-1.07)	-0.21 (-0.80)
Pseudo-R ²	0.19	0.28	0.23	0.21
Area Under ROC	0.78	0.83	0.81	0.80
n	147	147	147	147

***, **, * Indicate significance at $p < 0.01$, 0.05 , and 0.10 one-tailed, respectively, in the predicted direction.

^^, ^ Indicate significance at $p < 0.05$ and 0.10 two-tailed, respectively, for results in the opposite direction of predictions.

This table presents results of probit models estimated with robust standard errors clustered by respondent. The dependent variable is *CHALLENGING*, which equals 1 for engagements selected by participants as representing global group audit experiences with significant challenges; 0 for engagements selected as representing their non-challenging experiences. Independent variables are factors derived from polychoric factor analysis. Column A presents Model 1, a preliminary main effects model, showing overall associations of client/engagement characteristics and strategies with challenging engagements. Columns B through D present hypothesis testing models, which interact the strategy factors with each client/engagement factor, entered separately due to the large number of interactions that would occur in a single model. [*complexity factor*] in variable names for the interaction terms refers to the specific client/engagement factor interacted in each model. Column B presents Model 2, which interacts strategies with *SIZE*, Column C presents Model 3, which interacts strategies with *STRUCTURE*, and Column D presents Model 4, which interacts strategies with *BARRIERS*.

challenges, and by that standard are highly useful. Other strategies fail to mitigate the effects of higher complexity or have no influence at all.

Interactions of Strategies with Global Structure

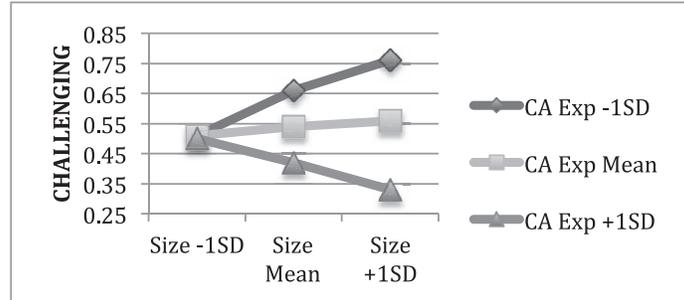
Table 2, Column C presents results of Model 3, testing whether the effects of strategies are contingent on the level of the client's global structure (i.e., number of global components of the entity, and statutory audit requirements of the selected component). Model results show that *STRUCTURE* is positive and significant ($p < 0.01$) but must be interpreted in light of the significant interactions discussed below. *TACIT_CA_EXPERIENCE*, *TACIT_CA_STABILITY*, and *TACIT_CA_KNOWLEDGE* are all negative and significant ($p < 0.01$) and their associated interactions are insignificant, implying that longer component auditor engagement experience, stability of component audit staff, and greater component auditor knowledge are associated with lower probability of challenges from global structure overall.

Model 3 also shows that the interaction of *STRUCTURE* and *MODULARIZATION* is negative and significant ($p < 0.05$). Figure 2, Panel C shows that for higher *STRUCTURE*, the predicted probability of a challenging audit decreases from 0.82 to 0.45 as modularization increases from lower to higher, while for lower *STRUCTURE* this order reverses (0.49 [0.18] for higher [lower] modularization). The interaction with *ONGOING_CONTENT* is also negative and significant ($p < 0.05$) in Model 3. We do not graph this interaction, as it is similar in shape to Figure 2, Panel C. For higher *STRUCTURE*, the predicted probability of a challenging audit decreases from 0.77 to 0.49 as component auditor involvement in meetings increases from lower to higher. However, for lower *STRUCTURE*, the predicted probability of a challenging audit is 0.52 (0.16) for higher (lower) component auditor involvement.

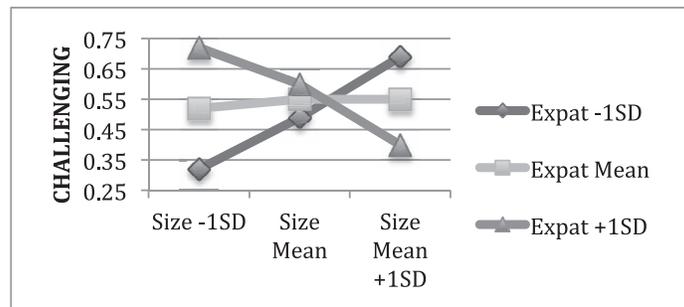
Taken together, results of Model 3 imply that a complex global structure strongly influences the probability of challenges, but an experienced, stable, and knowledgeable component team helps reduce this influence overall. In addition, the two significant interaction terms (with *MODULARIZATION* and *ONGOING_CONTENT*) in Model 3 exhibit a common pattern.

FIGURE 2
Predicted Probabilities for Interactive Effects of Client/Engagement Characteristics and Strategies on CHALLENGING

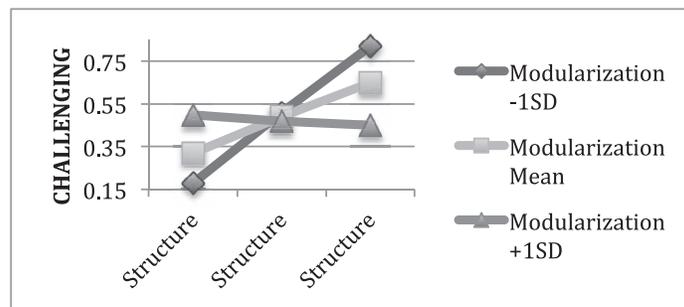
Panel A: Interaction of Size with Component Auditor Experience—*SIZE* and *TACIT_CA_EXPERIENCE*



Panel B: Interaction of Size and Component Auditor Expat—*SIZE* and *TACIT_CA_EXPAT*^a



Panel C: Interaction of Structure and Modularization—*STRUCTURE* and *MODULARIZATION*^b



This figure illustrates patterns of predicted probabilities of *CHALLENGES* for significant interactions at the mean of each factor, and one standard deviation above and below the mean, with other independent variables held at the average of their predicted values. For brevity, similar patterns are only illustrated once, as noted in the respective panels.

^a A similar pattern is also observed for the interactions of language and cultural barriers (*BARRIERS*) with content of ongoing communication (*ONGOING_CONTENT*), and *BARRIERS* with availability/use of electronic communication (*ONGOING_ELECTRONIC*).

^b A similar pattern is also observed for the interaction of *STRUCTURE* with content of ongoing communication (*ONGOING_CONTENT*).

When use of either strategy is higher, the probability of challenges is around the sample mean of about 50 percent regardless of the level of global structure. However, as global structure increases, the opportunity costs of *not* engaging in these strategies are evident from the striking increase in probabilities of a challenging audit for lower strategy use.

Interactions of Strategies with Language/Cultural Barriers

Table 2, Column D shows results of Model 4, testing whether the effects of strategies are contingent on the level of language/cultural *BARRIERS*. Results show that *TACIT_CA_EXPERIENCE*, *TACIT_CA_STABILITY*, and *TACIT_CA*

KNOWLEDGE are again negative and significant ($p < 0.01$, $p < 0.05$, and $p < 0.01$, respectively) with insignificant interactions, implying associations with lower probabilities of *CHALLENGING* overall. The interactions of *BARRIERS* with *ONGOING_CONTENT* and *ONGOING_ELECTRONIC* (availability/use of electronic communication) are both negative and significant ($p < 0.10$ and $p < 0.05$, respectively), with patterns similar to Figure 2, Panel B. For higher *BARRIERS*, the predicted probability of challenges decreases from 0.57 to 0.48 as *ONGOING_CONTENT* increases from lower to higher. For lower *BARRIERS*, this order reverses; higher *ONGOING_CONTENT* is associated with a higher probability of challenges (0.58 versus 0.38). Similarly, for higher *BARRIERS* the predicted probability of challenges decreases from 0.61 to 0.44 as *ONGOING_ELECTRONIC* increases from lower to higher. For lower *BARRIERS*, this order reverses; higher *ONGOING_ELECTRONIC* is associated with a *higher* predicted probability of challenges (0.60 versus 0.36).

Taken together, results of Model 4 continue to show the value of experienced, stable, and knowledgeable component auditors in reducing challenges due to differences in language and culture across teams. Greater component auditor involvement in initial engagement meetings and use of electronic tools have value in mitigating challenges when language and cultural barriers are higher, but are not advantageous when barriers are lower. An interesting feature of our data is that group auditors do not perceive language and cultural barriers to be very high overall (2.9 and 3.1 on 11-point scales, respectively, where 1 = very low and 11 = very high; Table 1 Panel A). This is consistent with English being the language of instructions and reporting packages (i.e., primary communications), as well as some consistency in the hiring and training policies of members of the Big 4 global networks.

Supplemental Analysis

To provide further insight, one author and a doctoral student with several years of auditing experience independently coded group audit leaders' responses to open-ended questions on the specific nature of challenging or non-challenging experiences, and details of coordination/communication between the group and component auditors (75.0 percent inter-coder agreement, Kappa = 0.824, $p < 0.01$). We developed categories for classification of responses using organization theory and the management literature. Discrepancies were resolved by the coders by reference to the original data. Specific questions and coding procedures are shown in the table notes for brevity. Table 3 presents results of this analysis in order of decreasing total frequency within each category, showing that we coded 539 individual attributes for the 180 questionnaires that included responses to the open-ended questions.

Table 3 Panel A first describes features of coordination/communication between the group and component auditors, predominately mentioned for challenging (74) or non-challenging (40) experiences. Lack of timeliness is more often mentioned for challenging experiences, than timeliness for non-challenging experiences. Similarly, weak component auditor communication is more often mentioned for challenging experiences, than strong communication for non-challenging experiences. Other attributes in this category concern component auditor activities, execution of audit work and documentation, both predominately contributing to challenging experiences. Panel A next presents client/engagement characteristics that relate to constructs in our models, moderately more cited for challenging experiences (29 versus 21). Regulatory regime (part of the *SIZE* construct) is most frequently mentioned (fairly evenly distributed). Language and culture follow, predominantly discussed for challenging experiences.

Table 3, Panel A further shows that two of the three coordination/communication strategies that we study are frequently mentioned by participants, more often for non-challenging experiences. Tacit coordination (i.e., competent, knowledgeable personnel, and stable component audit team membership) is mentioned 35 times for non-challenging experiences, while 24 mention low knowledge or high turnover for challenging experiences. Modularization is mentioned by only six participants, all supporting non-challenging experiences. The most frequently mentioned strategy is ongoing communication, more frequently for non-challenging (90 versus 67 for challenging). Within this strategy, synchronous communication media (i.e., face-to-face communication and conference calls) are most often mentioned, with similar distribution for challenging and non-challenging GGAs. Interestingly, despite the similar distribution of communication media discussed, the *nature* of the communication (frequent and spontaneous, with free exchange of information) is mentioned exclusively for non-challenging GGAs. Together, these results suggest that while synchronous communication characterizes both types of experiences, the group auditors in non-challenging experiences apparently felt more comfortable using those media to contact component auditors as needed. The use of asynchronous communication (i.e., email and instant messaging) is less often mentioned, and more often for challenging experiences.

Table 3, Panel B presents attributes mentioned that do not directly relate to constructs in the quantitative models. Internal controls were mentioned by 17 participants for challenging experiences, and 23 for non-challenging. Component auditor assistance with internal control work was cited predominantly for non-challenging experiences. Additionally, some challenging experiences are characterized by internal control deficiencies. These results relate to the suggestion of [Sunderland and Trompeter \(2017\)](#) that internal control testing in GGAs is a key topic for future research. The next category is client

TABLE 3

Descriptive Analysis of Written Descriptions of Features of Challenging/Non-Challenging Global Group Audits

Panel A: Factors Considered in the Models

	Total (n = 180)	Challenging (n = 88)	Non- Challenging (n = 92)
Features of Coordination/Communication with Component Auditors			
Timeliness of component auditor communication of issues and reporting (<i>untimely, timely</i>)	46	26	20
Component auditor communication (<i>weak, strong</i>)	36	21	15
Execution of component audit work (<i>poor, excellent</i>)	16	14	2
Component audit documentation quality (<i>poor, excellent</i>)	16	13	3
Subtotal	114	74	40
Client and Engagement Characteristics			
U.S. versus local regulatory regime (<i>dissimilar/unfamiliar, similar/familiar</i>)	26	12	14
Language barriers (<i>higher/lower</i>)	16	13	3
Cultural barriers (<i>higher/lower</i>)	5	4	1
Number of component audit teams (<i>more than typical/less than typical</i>)	3	0	3
Subtotal	50	29	21
Coordination/Communication Strategies			
Tacit coordination			
Component auditor knowledge/competence (<i>lower, higher</i>)	33	21	12
Component audit team staff (<i>turnover, stable</i>)	26	3	23
Subtotal	59	24	35
Modularization			
Provision of templates, examples, and U.S. prepared documents	6	0	6
Ongoing Communication			
Face-to-face communication	61	28	33
Conference calls (e.g., planning, interim, closing/reporting)	50	27	23
Frequent, spontaneous communication, free exchange	29	0	29
Email and instant messaging (e.g., meetings and discussions)	17	12	5
Subtotal	157	67	90
Control Variable			
Changes in the audit (<i>change/consistency</i>)	17	13	4

Panel B: Additional Factors

	Total (n = 180)	Challenging (n = 88)	Non- Challenging (n = 92)
Internal Controls			
Group auditor assists component auditor with control work	29	8	21
Control deficiencies and errors	11	9	2
Subtotal	40	17	23
Client Management Support			
Client component support, involvement (<i>less/more</i>)	28	15	13
Client group support, involvement (<i>less/more</i>)	8	0	8
Subtotal	36	15	21
Planning			
Instructions to components (<i>delayed/timely, clear, detailed</i>)	23	2	21
Multiple, clear, well established deadlines	9	0	9
Subtotal	32	2	30
Local Component Characteristics			
Component business/environment (<i>changing/stable</i>)	17	15	2
Component complexity/risk (<i>higher/lower</i>)	11	5	6
Subtotal	28	20	8

(continued on next page)

TABLE 3 (continued)

	Total (n = 180)	Challenging (n = 88)	Non- Challenging (n = 92)
Number (mean) of features mentioned	539 (2.99)	261 (2.97)	278 (3.01)

This table presents a descriptive analysis of participants' responses to open-ended questions asking about: (1) descriptions of the nature of the challenges (or lack of challenges) experienced on the selected component; (2) whether a team other than the component auditor performed any portion of the audit work, and if so, the nature of the work involved and coordination/communication challenges encountered; and (3) meetings and discussions with the component auditor. All 190 participants provided responses to at least one of the above questions. We exclude seven questionnaires from the qualitative analysis due to out-of-network membership of the component (4), or failure to meet the criteria of engagements included in our sample (3). Of the 183 questionnaires analyzed, 180 are represented in the above categories (three questionnaires did not discuss items related to the categories tabled). One author and a doctoral student with several years of auditing experience independently coded each question, with 75.0 percent inter-coder agreement ($Kappa = 0.824$, $p < 0.01$). Discrepancies were resolved by the coders by reference to the original data. For ease of presentation and clarity we omit 23 instances (relative to the 539 presented) where features were mentioned in the opposite direction to the preponderance of responses in that version of the questionnaire (e.g., one participant noted the component auditor's communication was particularly strong on a challenging engagement).

management support, with 15 challenging and 21 non-challenging. Within this category, client management support at the component level is relatively balanced, while support at the group level is only mentioned for non-challenging. Attributes related to planning are predominantly features of non-challenging experiences (30 versus 2). Finally, local component characteristics are mentioned 20 versus 8 times. Changes to the component business/environment are highlighted as important characteristics of challenging GGAs. Component complexity/risk is mentioned less frequently, and is fairly evenly distributed.

Overall, the data in Table 3 provide two high-level insights. First, Panel A shows that coordination/communication issues and client/engagement characteristics are more often discussed for challenging experiences, whereas strategies are more often discussed for non-challenging experiences. This is consistent with research on the self-serving bias (e.g., Försterling 2001; Kaplan and Reckers 1985); i.e., problems are often attributed to external causes (in this context, characteristics of the client and component auditor), while successes are often attributed to internal causes (activities undertaken by the group auditor). Second, comparing across strategies, Panel A shows that participants focus on ongoing communication (i.e., actions in which they are involved) more than on tacit coordination (i.e., knowledge or experience they observe). In contrast, quantitative model results show that tacit coordination is the most important differentiator between challenging and non-challenging experiences. Thus, when we prompted group auditors to consider component auditors' knowledge/experience (quantitative data), they responded with assessments that predict audit outcomes, but when not prompted (qualitative data) they discuss features of communication media and content that are more likely to be within their control. This suggests that when recalling challenges group auditors fall short of identifying knowledge/experience of the component auditor as a root cause of factors affecting audit outcomes. If so, the PCAOB's (2016a) proposal to require formal assessments of component auditor knowledge may lead group auditors to think more purposefully about tacit coordination and its impact.

VI. CONCLUSIONS

This study provides insights on GGAs derived from the recent experiences of highly experienced auditing professionals. Regulators are concerned about the high rate of deficiencies for GGAs and the potentially broad impact of low quality GGAs on the financial system (IAASB 2013; PCAOB 2016a; IFIAR 2017). However, few studies to date examine this important auditing context, and little information is made public by regulators/inspectors on the specific characteristics of these engagements (e.g., challenges and features of the client/engagement). Our results provide unique evidence on work processes in a sample of U.S. GGA engagements conducted by Big 4 audit firms. We discuss the implications of our findings below in light of regulatory activities as well as opportunities for future research.

The theoretical basis for our tests, derived from organization theory and the management literature on distributed work, proposes that coordination/communication challenges will be exacerbated when interdependent teams have difficulty observing/anticipating each other's actions. In auditing, most client and engagement characteristics that reduce reciprocal predictability (e.g., size, regulatory status, global structure, and countries in which the client operates) are outside the control of the group auditor once the engagement is contracted. As such, auditors seeking to reduce the risk of coordination failure are likely to adopt strategies to increase the predictive knowledge between team members. Of the three strategies we study, *tacit coordination* has the greatest influence, implying that establishing common ground between team members increases reciprocal predictability of action. Greater component auditor knowledge has the most widespread effect, mitigating challenges from all three types of client and engagement characteristics studied. Additionally, mitigating effects of greater

component auditor experience apply to all levels of global structure and language/cultural barriers, as well as to larger, public companies.

These findings reinforce recent focus by the IAASB and PCAOB on component auditor competence, but raise several questions. Taken together, our quantitative and descriptive analyses suggest the importance of component auditor knowledge/experience and illustrate the need for greater group auditor focus in this area. The PCAOB's (2016a) proposed assessment by group auditors of the knowledge, skill, and ability of component audit leaders at the onset of the audit would likely contribute to greater focus. However, such assessments present a number of challenges. For example, it is unclear whether the group auditor can accurately assess these elements before the audit, especially for personnel new to the component auditor team. Firm quality control systems may provide some information pertaining to the competence of the component auditor (e.g., summary statements and ratings, [Sunderland and Trompeter \[2017\]](#)). However, [Goelzer \(2009\)](#) suggests that not all firms set minimal training requirements for component auditors or make internal inspection ratings available to the group auditor. Thus, insight into component auditors' true capability might not be revealed until later in the audit process. This leads to the question of whether such quality control activities can "solve" issues of knowledge/experience on GGAs. Further, what remedies are available to the group auditor when a less competent component auditor is assigned? We did not design our study to investigate this issue, but consistent with [Sunderland and Trompeter \(2017\)](#), one participant noted that group auditors have little control over component team staffing. This issue may be exacerbated by the structure of global firm networks in which members are separate legal entities, and local statutes prohibit the group audit team from working locally. Additionally, group auditors may be unwilling to propose use of an out-of-network firm to the client's board for fear of providing other GNFs the opportunity to "win" the engagement, or out of reluctance to assume greater risk when engaging out-of-network firms. Standard setters may wish to consider such factors in addition to current requirements. Further experimental and survey research directed toward quality controls over component auditor characteristics and activities would be very useful in addressing this issue.

Other findings pertaining to tacit coordination relate to another aspect of the PCAOB's (2016) proposal. Specifically, we find that stability of lower level component audit staffing is important in mitigating challenges from two sources of complexity: global structure and language/cultural barriers. This implies that a relatively stable component team can assist group auditors to manage engagements when component team structures and team members are diverse, and may signal that consideration of component audit staffing beyond component audit leadership is warranted by regulators and firms. The proposed PCAOB (2016) standard focuses on assessing the competence of component audit *leaders*, but not component audit staff. Our results on staff stability suggest that regulators might consider expanding the assessment of component auditor capability beyond the more senior personnel. In terms of disclosure, our findings support consideration of requiring identification of those assisting the group audit partner.

Results regarding other strategies show that their effects are contingent on the type and level of client and engagement characteristics. Particularly, findings on modularization of work are not strong, although that strategy is commonly used within our sample. Our data show that the modularization is associated with a reduction of challenges only when clients are small/non-public, and when global structure is relatively complex (i.e., the group auditor is working with many component teams and/or the component team performs a statutory audit). Thus, while modularization might help manage more teams in a smaller client environment, it could be counterproductive for large, public clients, and does not help mitigate language/cultural barriers. Modularization is an appealing strategy to group auditors as it helps to satisfy documentation requirements regarding how component auditors were informed of their responsibilities and directed in their work. Yet, local adaptation of instructions may undermine modularization efforts (see [Barrett et al. 2005](#)). Thus, it is important that regulations focus group auditors on ensuring that both planned and *performed* audit work adequately address the risk of material misstatement (see [IAASB 2016](#)). Such interventions may require more effective monitoring processes, or other mechanisms to increase component auditor compliance (e.g., higher fees or penalties).

We also find limited effects of ongoing communication strategies. Greater component auditor involvement in meetings (related to engagement kickoff, discussion of instructions, and fraud brainstorming) is shown to mitigate the effects of a more complex global structure and high language/cultural barriers. Further, greater availability and reliance on electronic tools are helpful when language/cultural barriers are high. However, ongoing communication factors do not mitigate effects of size/regulatory status. Taken together with the weak effects of modularization, our results suggest that mitigating the effects of these characteristics is very difficult, supporting concerns that failure of a large global public company group audit could have far-reaching influence ([Doty 2011b](#); [PCAOB 2016a](#)).

For audit practice, our ongoing communication results imply that group auditors should continue to explore opportunities to involve component auditors in initial engagement meetings as a way to increase reciprocal predictability of action. Further, while firms espouse that audit training and tools are largely consistent across global networks, our data show that U.S. group auditors perceive that they are employed on a limited basis, and may not be available to all team members. This is consistent with prior research showing that auditors tend to value technology to a greater extent than it is used ([Janvrin, Bierstaker, and](#)

Lowe 2008). In global group audits this may be due to situated practices (i.e., component teams are unfamiliar with or unwilling to adopt such tools) or issues associated with accessing technologies (e.g., internet connectivity). In some respects, our results support regulators' interest in increasing communication between the group and component auditor (IAASB 2015b; PCAOB 2016a). One concern to increasing ongoing communication is whether auditors will default to more formal/written communication in efforts to document compliance with standards. While such an approach is unlikely to enhance two-way communication, the IFAC (2015) outlines several mechanisms that may facilitate effective implementation, such as emphasizing the need for in-person, telephonic, and virtual communication, outlining the responsibilities of component auditors in two-way communication, and providing examples of appropriate communication for group auditors. Our findings do not suggest that face-to-face communication mitigates challenges; however, the value placed on synchronous communication helps. Organization theory also generally supports specifying the responsibilities of component auditors and evaluating them on these criteria, as such efforts may reduce interdependence.

Our results provide a number of interesting avenues for future research. First, we find that language/culture barriers are not associated with challenges. While we note this is consistent with English being the common language of network firms, it may be that these barriers are more salient to component than to group auditors. If the group auditor's interactions with the component audit team are largely limited to providing instructions and discussing the results of the audit work summarized in the reporting package, they may be unaware of communication problems experienced by the component team. Future research investigating the nature and extent of challenges from the component auditor's perspective could also permit researchers to investigate factors influencing engagement staffing, a key topic we identify. Second, our data are perception-based. We follow prior research (e.g., Gibbins and Trotman 2002) in designing the study to limit recall bias, future archival and/or experimental research could investigate client/engagement characteristics and mitigating strategies using other measures. Such work could also assess the contexts in which specific strategies are most effective. For instance, why does modularization work on small, non-public engagements, and how does regulatory emphasis on documentation impact the effectiveness of this strategy? Finally, as more data become available (e.g., Form AP in the U.S.) future research may investigate whether regulators' concern for GGAs generalize to the entire population of multi-national engagements or are most applicable to large, risky entities.

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