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The Effects of Offshoring on Judgment Quality in a Management Accounting Task

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Abstract

This study investigates the effects of offshoring on judgment quality in a management accounting context (i.e., capital budgeting). The effects of offshoring on judgment quality are understudied and might explain the ineffective and inefficient use of information in offshoring arrangements (Srikanth and Puranam, 2011). A 3x2 between-subject experiment was conducted where participants were assigned to one of three experimental conditions: onshore team, offshore team, or no team. Two dependent variables were measured for judgment quality: effectiveness and efficiency. My results suggest that offshoring may have detrimental effects on efficiency. However, I also find that offshoring does not affect effectiveness.

Keywords: Offshoring; judgment quality; reciprocity; effectiveness; efficiency; richness theory.

1. INTRODUCTION

Offshoring is defined as the transfer of any business task to a new overseas location (Srikanth and Purinam, 2011; Feenstra, 2010). Many companies are motivated to offshore their tasks because they anticipate that they will be able to increase profits by exploiting lower labor costs overseas (Kehal and Singh, 2006). Meanwhile, these same companies also anticipate that they will not compromising judgment quality when they offshore tasks (Pyndt and Pedersen 2006). However, evidence suggests that offshoring may decrease judgment quality because virtual space can hinder individuals' ability to reciprocate information (Mesmer-Magnus, 2011; Munzer and Borg, 2008; Shamis et al., 2005; Sahay et al., 2003). Thus, the poor judgments that may come as a result of offshoring arrangements may offset the intended financial benefits and decrease judgment quality in comparison to when the same tasks are performed onshore (Sidhu and Volberda, 2011; Plunkett, 2005).

This study investigates the effect of offshoring on management accountants' judgment quality. The judgment quality of management accountants in offshoring arrangements is important for two main reasons. First, the number of judgments made by management accountants offshore will grow exponentially over time (Kehal and Singh, 2006). For example, by year 2015, 3.3 million managerial accounting and other white-collar jobs will be offshored from the U.S. to countries overseas with lower labor cost (McKinsey and Company, 2006). Second, offshoring mandates the use of technology to address the geographical distance between management accountants (Mesmer-Magnus et al., 2011). For example, e-mail is the most common communication method used to exchange ideas between parties when offshoring (Stephens et al., 2011; Sahay et al., 2003; Sussman and Siegal, 2003). E-mail provides *delayed reciprocity* and lacks the *immediate reciprocity* of face-to-face meetings (Munzer and Borg, 2008). Thus, the delayed reciprocity of e-mail may prevent a company from maintaining the same magnitude of judgment quality when offshoring is not used. Overall, if *delayed reciprocity* does negatively influence management accountants' judgment quality, offshoring may decrease profits instead of achieving the intended results of increasing profits (Sidhu and Volberda, 2011). Thus, this issue remains unresolved. This study provides empirical evidence on this issue.

A 3x2 between-subject experiment is conducted where the participants are randomly assigned to one of three independent variables. Participants made their judgments individually (a control with *no reciprocity*, henceforth "IND"), in *immediate reciprocity* groups (face-to-face meetings, henceforth "FTF"), or in *delayed reciprocity* groups (met via e-mail, henceforth "CMC"). CMC is the proxy for outsourcing. Efficiency and effectiveness, the dependent variables, are proxies for judgment quality. Effectiveness is based on a capital budgeting case that calls for judgment to allocate scarce resources. Efficiency is measured based on the time spent to complete the task. One hypothesis is that offshore teams will render lower quality judgments and will take longer to make judgments than onshore teams. Another hypothesis is that offshore and onshore teams will exhibit higher judgment quality than individuals. The last hypothesis is that onshore teams will take less time to make their judgments than individuals.

Richness theory explains that the ability of members in judgment-making groups to make judgments is dependent on their ability to reciprocate information (Mennecke et al, 2011; Munzer and Borg 2008). That is, judgment quality is dependent on the number of the visual cues, reduced feedback latency, and interpretations reciprocated within the group (Mesmer-Magnus et al., 2011; Daft and Lengel, 1986). So, the more cues and interpretations exchanged by the members within the group with short time lapses, the better the judgment quality of the group.

For instance, FTF are expected to provide a richer exchange of ideas than IND and CMC because FTF members have access to additional communication cues (body language, facial expression, etc.). A continuum of richness in order of increasing richness includes reading written documents alone where there is *no reciprocity*, electronic mail where there is *delayed reciprocity*, and face-to-face meetings with *immediate reciprocity*.

The results of this study suggest that the *delayed reciproxity* that is present in CMC (offshoring) condition does decrease judgment quality because it takes longer to make the same quality judgment as the FTF (onshoring) condition. This study also finds that offshoring might not affect judgment quality effectiveness. These results are consistent with offshoring producing the same magnitude of effectiveness as the onshore context where management accountants meet face-to-face. However, offshoring does require more time to reach the same level of judgment quality as face-to-face meetings.

In section 2, the study describes the literature and presents the hypotheses. In section 3, the research method is discussed. The results are presented in section 4. Section 5 concludes with a brief summary of the findings, discusses the limitations of this study and proposes possible future extensions.

2. HYPOTHESIS DEVELOPMENT

2.1 Richness

Richness has received a significant amount of attention in the management, cognitive psychology, information systems, small group, ethics, communication, and auditing literature. The more immediate the reciprocity, the more likely that verbal and visual cues will act simultaneously with instantaneous feedback among individuals to enhance interpretation sharing and idea generation processing. This rapid idea sharing and information processing fosters improved learning relative to asynchronous communication. Also, it includes non-verbal learning that takes place through vocal tone and body gestures that does not exist without face-to-face interaction. Ultimately, the combination of vocal tone, body language, and reduced gaps in response time enable judgment-makers to better grasp the available information (Lim and Benbasat, 2000). Also, judgment-makers prefer to process problems with multiple possible solutions with mediums that are of higher richness (el-Shinnawy and Vinze, 1998; Daft and Lengel, 1986).

Media that lack instantaneous feedback have lower richness (Munzer and Borg 2008). Judgment-makers can work together and send messages to each other at the same time, but they are dependent on their technology to close the time gaps between receiving responses. As the communication method reduces the gaps in response time the richness of the medium increases. Munzer and Borg (2008) assigned seven teams to one of three experimental virtual chat conditions to complete a murder mystery task. Their results suggest that asynchronous chat, a virtual method similar to e-mail, influenced teams to take more time to complete their murder mystery task. However, they did not observe any variation in the solutions recommended by the teams in each of their three experimental conditions.

Another characteristic of decreasing richness mediums is the absence of verbal and visual cue feedback. Ironically, the importance of verbal or visual cue feedback in offshoring is de-emphasized by Srikanth and Purinam (2011) because they attribute offshoring success to the sharing of process interdependencies. But the relevance of the virtual communication is vital to

offshoring process interdependencies and should not be de-emphasized (McNamara et al. 2011; Lee et al. 2011; Sidhu and Volberda 2011; Stephens et al. 2011; Magnus et al. 2011; Mennecke et al. 2011; and Shin and Song 2011). Ceteris paribus, information loss occurs with the lack of verbal and/or visual cues including the frustration that stem from delayed reciprocity.

Like Srikanth and Purinam (2011), most prior research of richness focuses on process rather than judgment quality. Of course, processing effects can have both positive and negative effects on judgment quality, but many of these studies exclude objective quality measures (e.g., McNamara et al., 2011). Furthermore, richness is commonly discussed for its influence on social and organizational factors such as anonymity and hierarchical presence that influence judgment processing (McNamara et al., 2011; Munzer and Borg, 2008; Sia, et al., 2002; Marginson, et al., 2000; Dennis, 1996; Keisler and Sproull, 1992).

2.2 CMC Versus FTF

McNamara et al. (2011) used a team simulator to give their subjects the impression that they were on virtual teams. They documented that subjects who categorized the chat communications they received, self-reported that they were more satisfied. Baltes, et al. (2002) pointed out in their meta-analysis that there are many virtual team studies but a majority of them focus exclusively on self-assessed individual member satisfaction while excluding an objective measure of the effectiveness of the group judgment solution. Baltes et al. (2002) also concluded that satisfaction measures alone are of little use to organizations that are contemplating whether to encourage their groups to use computer-mediated or face-to-face communication. However, it is worthwhile to note that a majority of these studies, like my study, analyzed efficiency by measuring time.

Griffith, et al. (2003) refers to information technology as a “jealous mistress” because it can destabilize relationships within organizations and derail the transfer of knowledge. However, technology does enable members within an organization to offer input and circumvent social barriers to resolve conflict (Connolly, et al., 1990; George, et al., 1990). This is prevalent when the technology conceals the identity of the user where hierarchical organization structures are involved. Munzer and Borg (2008) suggested that virtual judgment-makers maximize their information processing ability by using technology to store and retrieve information. Sia, et al., (2002), Zigurs and Buckland (1998), El-Shinnaway and Vinze (1998), and Keisler and Sproull (1992) also argued that virtual teams render better judgment processing than traditional teams because technology mitigates the logistical and group dynamic issues such as hierarchical and social presence issues that traditional teams cannot overcome. Duarte and Snyder (1999) also noted that computer-mediated-communication might be more suitable than face-to-face meetings when team members need time to ponder or consider an issue and the problem can be solved using data alone. In response to these studies, Sidhu and Volberda (2011) propose that direct horizontal communication between different hierarchical levels of onshore and offshore teams is likely to enhance judgment quality. Thus CMC could outperform FTF when hierarchies are present within the team. In this study, the students do not have hierarchy over each other. Sumner and Hostetler (2002) analyzed the decision quality of participants who completed a systems analysis project as a required class assignment. They found that electronic mail teams exhibited higher descriptive averages in decision quality, analytical strength, and technical strength than face-to-face teams.

Baltes, et al. (2002) found that virtual teams were just as effective as face-to-face teams during open-ended time intervals for intellective and conflict tasks. The issue of whether FTF and CMC groups do affect performance in judgment tasks is not settled. In fact there is debate on how FTF and CMC map into richness. Some researchers argued that electronic mail has the same amount of richness as FTF (Sussman and Siegal, 2003), Murthy and Kerr (2004) declared the CMCs offering high information processing are superior to FTFs.

In this study, FTF is expected to exhibit better judgment quality than CMC. Lim and Benbasat (2000) urged that the immediate sharing and processing of face-to-face groups fosters improved learning among team members and, ultimately, enables judgment-makers to better grasp the information available and the choices that need to be made. This implies that face-to-face meetings should be more effective than computer-mediated-communication when there is the potential for conflicting interpretations among team members and/or the team members need to debate and discuss their interpretations to reach a judgment (Duarte & Snyder, 1999). Mesmer-Magnus et al. (2011) performed a meta-analysis of 94 research manuscripts. The results in Mesmer-Magnus et al. (2011) suggest that FTF teams share information are more openly and share more unique information than virtual teams.

The student subjects in Shin and Song (2011) used FTF and multiple virtual methods (chat and online message boards) to write multiple group essays. The objective of Shin and Song's (2011) within-subjects investigation was to assess whether the time spent in CMC had a greater positive effect on group task performance than FTF. Three PhD students subjectively evaluated the quality of each groups' essay. They concluded that the time spent in CMC has a greater positive effect on group task performance than the time spent in FTF. This study, on the other hand, is between-subjects and compares not only FTF and CMC but also analyzes individual judgment-quality using an objective measure, effectiveness.

Dennis (1996) compared face-to-face and virtual mediums with the use of hidden profile tasks where the participants relied on their collective cognitive ability to combine information that was segregated among team members. Processing differences between virtual and face-to-face groups have been found to be prevalent when social and organizational factors are examined (Marginson, et al., 2000). Lee et al. (2011) investigated the preferences of individuals to share interpersonal information virtually or FTF. Their results suggest that FTF is the preferred medium. So, the judgment-quality that is present in FTF (onshoring) may be superior to CMC (offshoring).

Miranda and Saunders (2003) note that distractions appear when judgment-makers not only have to deal with problem resolution, but they also have to focus their attention on the proper use of the technology while sorting through delayed feedback on information cues. The implication is that FTF processes should help judgment-makers separate irrelevant from relevant information more so than processes that include delayed reciprocity.

El-Shinnawy and Vinze (1998) and Cappel and Windsor (2000) argued that the presence of verbal and visual cues in face-to-face teams improved the likelihood of error correction and idea generation. Duarte and Snyder (1999) claimed that face-to-face teams tend to out-process virtual teams when teams discuss highly emotional or ambiguous issues because virtual teams require more effort from participants to reach understanding.

Lim and Benbasat (2000) and Miranda and Saunders (2003) stated that face-to-face team members can take turns, directly discuss subjective interpretations, and complete the discussion of a given item before moving on to the next discussion point. They argued that virtual teams, by contrast, experience difficulty because their members will work more independently, rather than

working together on one issue at a time like the face-to-face teams. Duarte and Snyder (1999) also suggest that face-to-face media encourage team members to collaborate at the time a topic is discussed, whereas virtual team members prioritize their attention according to self-imposed agendas. The implication is that face-to-face teams should out-perform the virtual teams (also see Barki, et al. 1999; Daft and Lengel, 1986).

Murthy and Kerr (2004) measure problem-solving performance but in an intellective context by comparing asynchronous electronic bulletin board teams versus synchronous chat teams versus face-to-face teams. They found that e-board teams out-perform chat teams and face-to-face in the number of conveyed items because e-boards offered better information processing capabilities.

Hedlund, et al. (1998) measured decision accuracy, but they used a task with a single correct answer and hierarchical teams with heterogeneous expertise. Krisstensson and Norlander (2003) measured creative performance (number of ideas generated), and they concluded that face-to-face teams outperformed virtual teams. Barki, et al. (1999) used a mixed-motive task in an organizational setting that required their student participants to agree on a production plan. They found that individuals in the traditional face-to-face condition received more individual rewards and lower group deviation from the efficient frontier than the Group Decision Support System (GDSS) condition. They also found that the individual rewards of the team leaders were similar between the virtual and face-to-face teams but the deviations were larger for the virtual condition. Time to solution was not affected by experimental conditions. Wilson (2003) compared the effects of persuasion in face-to-face and virtual groups. He found face-to-face teams to be best at achieving and applying persuasion. Cornelius and Boos (2003) studied the effect of training and media on the frequency of agreements and disagreements of team-members.

Many studies have found that virtual groups take longer to reach consensus than face-to-face groups mainly because of the additional time that it takes to type responses and the time that it takes to determine how to use the technology to solve the problem (George, et al., 1990; Connolly, et al., 1990; Dennis, 1996; Bamber, et al., 1996; Ho, 1999; Cappel & Windsor, 2000; Murthy and Kerr, 2004). Duarte and Snyder (1999) pointed out that virtual task forces are challenged because they invest more time in establishing agendas and logistical protocols in the initial stages before focusing on the problem to be solved.

If judgment quality is similar between the CMC and FTF conditions, offshoring would be worthwhile. Business entities could realize the same magnitude of judgment quality while lowering their operational cost. The end result of this could mean increased profits. Thus, FTF teams will provide more effective judgments, projected earnings rates or ΔPV%, than CMC teams. Ceteris paribus, this study predicts the following alternative hypotheses.

H1: FTF (onshore) teams will have better judgment quality than CMC (offshore) teams.

H2: FTF (onshore) teams will take less time to make their judgments than CMC (offshore) teams.

2.3 FTF and CMC Teams Versus IND

On the question of how group-processing features are different from individual problem-solvers, Sniezek (1992) offered two perspectives. Her information processing perspective is that

groups combine their information processing resources to an amount that exceeds the processing capacity of individuals. From Sniezek's motivational perspective, groups tend to expend more time and effort to reduce their subjective uncertainty.

FTF and CMC teams are expected to perform more effectively than participants in the IND cell (Hill, 1982; Sniezek, 1992). This study also expects FTF teams to experience higher proforma earning returns than CMC teams because of their immediate feedback response in addition to their verbal and visual cues. These effects should be prevalent in the context of this study typified by (1) unfamiliar team members with common profiles worked in a project team/task force scenario, (2) the work was non-routine, (3) the solution was ambiguous, and (4) the group made choices based on members' own judgments as the work progressed (Gersick and Davis-Sacks, 1990). This study expects FTF teams to reach their judgment solutions in less time than CMC and IND teams. Additionally, it is hypothesized in this study that the teams would perform more efficiently than individuals.

Mennecke et al. (2011) extends Sniezek (1992) and states that the sharing of space with other individuals creates richness in judgment-making contexts. Mennecke et al. adds that substantive interactions in group settings enable individuals to encode deeper meanings and conveyances. So, the team should display more judgment quality than individuals. However, the results in Choi et al.'s (2010) field study are mixed. Based on Choi et al.'s findings, knowledge sharing in team settings may not improve decision-quality. But Choi et al. also conclude that knowledge sharing in team settings does improve the team's ability to apply the information that they share with each other. Thus, groups perform better than individuals because the information that they share enable them to better apply the information that they share (Choi et al., 2010).

The impact of richness on judgmental judgment processing of small groups has been explored somewhat in the auditing literature. Schultz and Reckers (1981) examined pre-group and post-group assessments of the probability auditor lawsuit loss regarding the recording of contingent liabilities while exposing their study participants to virtual telephone discussion or face-to-face meetings. They found that telephone communication is associated with lower lawsuit loss assessments than face-to-face. Bamber, et al. (1996) applied the same task as Schultz and Reckers (1981) but instead of using telephone communication as the communication medium, a Group Support System was compared to face-to-face. The main dependent variable of interest in both Schultz and Reckers (1981) and Bamber, et al. (1996) is choice shift. Choice shift deals with sequential shifts in judgment-making as a result of pre-group, group, and post-group exposure to the task. Ho (1999) studied dispersion of going concern judgments where Group Decision Support Systems are compared to face-to-face group judgments. However, like other virtual team studies, Ho (1999) emphasized processing measures, not performance measures.

This study avoids the choice shift phenomenon investigation that was performed in some of the other studies to mitigate potential learning effects and to strengthen my ability to compare computer-mediated teams and face-to-face teams (Trotman, et al. 1983). Second, although virtual and traditional face-to-face teams are contrasted in much of the existing literature, they fail to analyze the benefits of richness by comparing the responses of groups to individuals. Third, this study introduces a unique experimental task that is judgmental and goes beyond an auditing context; where accountants, like other business professionals, rely on financial statement information to make an investment decision.

This study predicts that the opportunity for feedback, visual cues, and the exchange of information that is prevalent in FTF teams will enable FTF teams to complete judgment tasks in less time than CMC teams and IND. Thus, FTF teams will take less time than CMC teams and

IND to complete judgment tasks. This prediction can be attributed to the lack of interpretation sharing present in IND, the frustration of IND completing the task alone, and the time used by CMC teams to establish protocol (communicate via the use of e-mail as a team while responding to the task at hand). As a result, FTF teams should take fewer minutes to complete the judgment task than IND.

This study hypothesizes that reciprocity allows for better coping with equivocality than no reciprocity at all. Both of the aforementioned reciprocity conditions, FTF and CMC, should make more effective judgments than IND (no reciprocity). The ability to share interpretations should lower equivocality and lead to better judgment quality. Ceteris paribus, this study predicts the following alternative hypotheses.

H3: Teams will both have better judgment quality than IND (individuals, working alone).

H4: FTF (onshore) teams will take less time to make their judgments than IND (individuals, working alone).

3. RESEARCH METHOD

A continuum of CMC's exists. Telephones, Group Decision Support Systems (GDSS), and Group Support Systems (GSS) have been used as examples to analyze decision processing in the existing literature (Schultz and Reckers, 1981; Bamber, et al., 1996; El-Shinnawy and Vinze, 1998; Barki, et al., 1999; and Ho, 1999). However, it is more likely that virtual teams will use electronic mail as their communication method (Stephens et al., 2011; Phillips & Eisenberg, 1993; Sussman and Siegal, 2003). Electronic mail is an asynchronous CMC where individuals can only communicate with each other one at a time. Electronic mail is the most ubiquitous CMC that accounting teams use to communicate so studies that measure the impact of lower richness mediums should focus on this area (El-Shinnawy and Vinze, 1998; Marginson, et al., 2000). Therefore, e-mail is used as the CMC in this study.

The design is a 3x2 factor model with three levels of reciprocity and two response variables, judgment effectiveness and judgment efficiency. Judgmental effectiveness was operationalized as the earnings rate (in percent) implicit in the solution provided to the task (see Frederickson and Miller (2004) for an example of the use of pro-forma earnings as a performance measure). The other dependent variable, judgment efficiency is an indicator of the relative sacrifice incurred using different media. Efficiency was operationalized as the time to complete the task. For professional judgments, time spent on task is a major cost component, conceptually, pro-forma earnings return is an indicator of effectiveness and time to complete the task is an indicator of efficiency.

Three levels of the independent variable are immediate reciprocity (face-to-face teams), delayed reciprocity (e-mail teams), and no reciprocity (control, individuals). The face-to-face teams, e-mail teams, control treatments are hereafter referred to as FTF, CMC, and IND, respectively.

The use of the ΔPV% variable is derived as the measure of effectiveness based on weighted responses of a panel of four business school faculty members at a major U.S. university and a financial industry professional. The panel weighted the net present value capital budgeting technique as the preferred method to evaluate investments. The measure, ΔPV%, is used as judgment effectiveness because management accountants and other financial professionals judge

for themselves on which line item on the income statements as the best proxy of earnings before taxes (Hodder et al, 2008). The participants in my experiment were asked to estimate the earnings before taxes based on their subjective review of multi-year pro-forma income statements. The participants had to estimate the components to input into equation 1 after reviewing the pro-forma income statements. The panel solution was used to provide an expectation of how the participants could respond to the case. The elapsed time to make the judgmental selection, the measure of efficiency, is henceforth referred to as MINUTES.

$$\Delta PV\% = \frac{PVEBT_{t+1} - PVEBT_t}{PVEBTt} \qquad (1)$$

*PVEBT is the pro-forma present value of earnings before taxes.

A pilot test was performed over a two-day period on a different, but similar sample of participants prior to the collection of the data that was for this study. Pilot test participants were asked to compile a pro-forma income statement and evaluate one company based on their knowledge of performance measures and capital budgeting techniques that they acquired in an undergraduate accounting course. After reviewing a narrative that is similar to the narratives used in this study, pilot test participants were asked to evaluate whether the hypothetical company was worthy of venture capital funding. No judgment aid was provided to the pilot test participants and the task was completed pre-group then group or vice versa (Schultz and Reckers, 1981; Trotman, et al., 1983; Bamber, et al., 1996; Ho, 1999).

The Human Subjects Committee at a large, public, state university in the southeast United States approved the experiment. Eighty undergraduate business students at that university were given six hours of training over a two-week period. The training consisted of textbook coverage, classroom lectures, and classroom discussions on performance measures and capital budgeting tools: return on investment, residual income, net present value, accounting rate of return, and payback period. The last day of training involved a sample business case like the case used for this study. It consisted of: a judgment aid, a hypothetical company that had a narrative similar to the narratives used in the experiment, and a pro-forma income statement that covered year t and year t+1. The initial outside investment required for the hypothetical company was estimated, and then the performance ratios and capital budgeting tool measures were estimated.

After completing their practice business case, the students were asked for their voluntary participation in the experiment in return for extra course credit. The participants were randomly assigned. Additional screening was performed to ensure that none of the teams had members who had currently worked together on other projects. No modifications to the random team assignments were necessary. In addition to randomization that emulates a newly formed project management accounting team, the use of common profiles insured no presence of confederates, status variation, or mediators (Barki, et al., 1999). The experimental procedures are depicted below.

[Numbered List Here]

The experimental data was collected within a twenty-four period during two, two-hour data collection sessions. Each FTF group met in different rooms where they were audio-taped (Keisler & Sproull, 1992). Two computer labs were used simultaneously for the CMC participants where members on the same teams were assigned to seats so that teammates could

not sit in close proximity. Also, one of the three CMC team members sat in different computer labs from the other two teammates. All CMC e-mail correspondence included the researcher in the distribution so that electronic text transcripts were retained (Keisler & Sproull, 1992). IND participants were situated in large classrooms with adequate spacing between each individual to insure individual work. All CMC and IND participants were monitored by proctors while they completed the experiment.

All participants were provided with a common profile business case that consisted of two-year pro-forma income statements, narratives for four hypothetical companies, and judgment aids. Participants were then asked to make judgments regarding the initial outside investment dollar amount and the earnings reinvestment of the investee for the next two financial periods. Then the participants were asked to estimate the return on investment, residual income, net present value, accounting rate of return, and payback period ratio for each of the four firms. The business cases were based on four hypothetical, privately-held, high-tech companies in the same emerging market industry where they were competing for the limited funding resources of a venture capital firm. Lougee and Marquardt (2004) found that high-tech firms with less informative Generally Accepted Accounting Principles (GAAP) earnings are more likely to disclose pro-forma financial reports. The participants were asked to assume the role of agents of a venture capital firm. Specifically, they were (depending on their random experimental conditional assignment) an individual contributor accounting manager or a member of a project team that was made up of accounting managers.

The case materials were reviewed by a professional investment consultant from a major international brokerage firm and two members of the accounting and finance faculty at a large state university. In order to complete the task, participants were asked to make judgments about the amount of outside funding required to complement the projected reinvested earnings of the four emerging market firms and their new projects for the next two years. The participants conclude the judgmental task by selecting one or none of the firms for venture capital funding, according to their judgmental assessment of the performance measures and capital budgeting techniques for each of the four companies.

Any student who chose not to participate was given the option of writing a paper on Activity Based Costing for similar course credit. The consent forms of the volunteer participants were numbered 00 up to 97 and randomly assigned to the experimental treatments (see Table1, panel B: FTF 10 groups vs. CMC 13 groups vs. IND 11 individuals) based on Rand's random digits (Schlaifer, 1959, p. 708). Teams with less than three members were excluded from the analysis of this study.

The classroom study and training insured that the participants were capable of handling the experimental task. Judgment aids were provided to participants to align their behavior with the heuristics used by practitioners in the estimations of capital budgeting techniques (payback period ratio and net present value), performance measures (accounting rate of return, residual income, and return on investment), and preferable levels of each estimation. Participants were encourages to perform all the calculations and to rely on their judgment (team or individual depending on their experimental condition).

The judgment aid for the NPV estimation is based on the following model:

$$NPV = \{[NI_t\ (\%)] \times PV_t + [NI_{t+1}\ (\%)] \times PV_{t+1}\} - III \qquad (2)$$

NPV = Net Present Value
NI_t = Pro-forma Net Income for the first year
NI_{t+1} = Pro-forma Net Income for second year
% = Income Reinvestment Percentage application judgment
PV_t = Present Value of $1 for first year
PV_{t+1}= Present Value of $1 for second year
III = Initial Investor Investment judgment

*PV is estimated below based on $1/(1+i)^n$

Year	3%	4%	5%	6%	7%	8%	10%	12%
First	.9709	.9615	.9524	.9434	.9346	.9259	.9091	.8929
Second	.9426	.9246	.9070	.8900	.8734	.8573	.8264	.7972

4. RESULTS

Table 1, panel A documents that all subjects self-reported that they had used e-mail prior to this experiment. The subjects in this experiment also self-reported that they had a similar amount of work experience. The FTF, CMC, and IND cells self-reported similar average years of work experience of 4.38, 4.21, and 4.10, respectively. Moreover, subjects also self-reported that they had similar participation frequencies on teams and groups. The FTF, CMC, and IND cells self-reported that had previously participated in 6.64, 6.49, and 6.63 teams, respectively.

[Insert Table 1 Here]

Table 1, panel B summarizes the units analyzed in this study. Ten, 3-member FTF teams provided data for this study. Thirteen, 3-member CMC teams also provided data for this study. Eleven individuals in the control group worked individually to complete the experiment for this study.

Judgment quality was determined based on two measures. First, effectiveness, or ΔPV%, the mean judgments of the change in earnings before taxes were 19, 15, and 6 percent for the CMC, FTF, and IND treatments, respectively (standard deviations are in parentheses). Second, efficiency, the number of minutes to complete the tasks, were 107, 72, and 75 for the CMC, FTF, and IND treatments, respectively (standard deviations are in parentheses).

[Insert Table 2 Here]

Table 3 reports the results of the statistical tests. Panel A of table 3 reports that overall, there is no variation among the three treatments on effectiveness (F-statistic = 1.85, one-sided p-value = 0.17). Panel B of table 3 allows us to look at effectiveness in more detail. The FTF vs. CMC contrast in panel B documents the results for hypothesis 1 (F-statistic = 0.28, p-value = .60). Thus, Hypothesis 1 cannot be rejected. Hypothesis 3 can be analyzed by evaluating the CMC vs. IND contrast (F-statistic = 3.58, p-value = 0.068) and the FTF vs. IND contrast (F-statistic = 1.60, p-value = 0.215). Therefore, hypothesis 3 also cannot be rejected.

[Insert Table 3 Here]

Panel C of table 3 reports that overall, there is variation among the three treatments on efficiency (F-statistic = 11.29, one-sided p-value > 0.00). Panel D of table 3 allows us to look at efficiency in more detail. The FTF vs. CMC contrast in panel D documents the results for hypothesis 2 (F-statistic = 17.27, p-value > .00). Thus, Hypothesis 2 can be rejected. Hypothesis 4 can be analyzed by evaluating the CMC vs. IND contrast (F-statistic = 15.34, p-value > 0.00) and the FTF vs. IND contrast (F-statistic = 0.11, p-value = 0.75) in panel D. Therefore, the evidence for hypothesis 4 is mixed. CMC took significantly longer to make their judgments in comparison to IND. But, the amount of minutes necessary for IND to make their judgments did not vary significantly from FTF.

5. CONCLUSION

The results of this study are mixed. Offshoring does decrease judgment efficiency but offshoring does not affect judgment effectiveness. More specifically, CMC teams in the delayed reciprocity (offshore) condition made effectiveness judgments that were statistically similar to teams in the FTF in the immediate reciprocity (onshore) condition, but the immediate reciprocity (onshore) condition teams took considerably less time. Time is a very costly resource for organizations. Accounting project teams and task forces often face unique, non-routine problems with ambiguous solutions that require timely action. It appears that traditional FTF teams perform best in this scenario.

These results are important because they imply that offshore teams can perform just as well as traditional onshore teams, but traditional teams distinguish themselves by acting faster. Another important point is that business entities are better off by employing offshore and onshore operations because individuals who act alone appear to exhibit poor judgment quality when using management accounting information.

This study hypothesizes that FTF teams would outperform CMC and IND in judgment quality. The results of this study are mixed. Thus, richness, or the reciprocity that is derived from richness, does influence management accountants' judgment quality but it does not appear to be the sole explanation. Richness literature document that social factors within the group could enable CMC teams or task forces to overcome the lack of media richness and outperform FTF groups (Lee et al., 2011; McNamara et al., 2011; Mennecke et al., 2011; Stephens et al., 2011). Although the results suggest no significant difference between FTF and CMC for the ΔPV% dependent variable, some unmeasured social factors could be present. More research is necessary in this area. Measuring the outcomes of small accounting groups that have subordinates and superiors could extend this study. This matter is left for future research.

Departures from the predicted outcomes might infer that social factors dominate small accounting group outcomes and not richness. This study assumes that the screening procedures used (see table 1) in addition to the randomized richness assignments alleviated the social problems that might stem from prior working relationships (Gersick and Davis-Sacks, 1990). This assumption could not be tested because of the small sample size in the study.

The results of this study coupled with the tenuous results found in the existing process-oriented literature makes it inconclusive as to whether richness, social, or information processing theories best explain the judgment performance of accounting groups. In addition to these competing theories, omitted variables may limit the results of these studies and might account for the mixed results that I find. The identification and control for these omitted variables in

conjunction with the best predictive theory will end the debate as to which environment will allow accountants to make optimal judgments.

The descriptive statistics in Table 1, panel A indicate that the CMC subjects were highly and equally familiar with electronic mail. Familiarity with the technology could have been found to mitigate the difference between FTF and CMC (Connolly, et al., 1990; George, et al., 1990) where the e-mail CMC was just as powerful as the FTF (Philips and Eisenberg, 1993; Sussman and Siegal, 2003). More variation on CMC should be investigated to resolve this issue (Murthy and Kerr, 2004). The wide continuum of existing and future CMC's offers many avenues for future research. For example, a CMC (e-mail) is examined in this study. More research on other synchronous CMCs like instant messaging and videoconferencing should be investigated.

Other departures from the findings in this study could result from process-related and/or participant-related limitations of the study. It is in this study that the judgmental quality of the participants in this study mirror that of accounting managers based on the average teamwork and e-mail experience of each participant (see Table 1 panel A), the specific training they received for this task, their performance on the practice task, and the assistance of judgment aids.

The many facets of group decision-making and the vast amount of unexplored CMCs offer a plethora of research opportunities. While the dynamics of judgment processes continue to be a beneficial area of inquiry, this study suggests that future research also investigate performance on ill-structured tasks, especially as it relates to accounting judgments.

NUMBERED LIST: MODEL OF THE EXPERIMENT

1. Volunteer participants are randomly assigned to FTF, CMC, or IND richness conditions after all had received the same prior training.
2. Participants are given common profiles: two-year pro-forma income statements, short narratives, and judgment aids for four hypothetical companies (each company is distributed in randomized block order).
3. Participants decide how to integrate the potential income reinvestment amounts for each of the four companies.
4. Participants estimate the initial investment amounts that are needed by each of the four firms to fund the companies' new projects.
5. Participants estimate ROI, Residual Income, Accounting Rate of Returns, Payback Period Ratio, and NPV with the help of judgment aids for each of the four companies.
6. Participants select one or none of the companies for venture capital funding and justify their response.

Table 1: Descriptive Statistics

Panel A

Reciprocity Level	Avg. # of Years of Work Experience	Average Frequency of Working with Teams	% With Team E-mail Use	% Comfortable Working in Team Environment
FTF	4.38	6.64	100%	97%
CMC	4.21	6.49	100%	95%
IND	4.10	6.63	100%	100%

Panel B

Reciprocity Level	# of Participants	# of 3-Member Teams
FTF	30	10
CMC	39	13
IND	11	N/A

Notes
FTF = onshore, traditional face-to-face teams with immediate reciprocity
CMC = offshored teams that use e-mail to communicate, delayed reciprocity
IND = individuals in the control group acting alone, no reciprocity

Table 2: Mean (Standard Deviation) of Percentage Return and Time in Minutes to Complete the Task

	Independent Variable: Reciprocity		
Dependent Variable	**CMC**	**FTF**	**IND**
ΔPV%	19%(19%)	15%(20%)	6%(7%)
MINUTES	107(15)	72(24)	75(22)

Notes
FTF = onshore, traditional face-to-face teams with immediate reciprocity
CMC = offshored teams that use e-mail to communicate, delayed reciprocity
IND = individuals in the control group acting alone, no reciprocity

ΔPV% = pro-forma earnings growth rate = $\Delta PV\% = \frac{PVEBT_{t+1} - PVEBT_t}{PVEBTt}$

Where PVEBT is the pro-forma present value of earnings before taxes

MINUTES = Amount of elapsed time to make judgment

Table 3: ANOVAs For the Judgment Effectiveness and Judgment Efficiency

Panel A: Judgment Effectiveness: Percent Return Model

Source	df	MeanSq	F-stat.	p-value	R-Square
ΔPV%	2	.04987	1.854	.174	.107
Error	31	.0269			
Total	33				

Panel B: Judgment Effectiveness: Percent Return Treatment Contrast

Source	df	MeanSq.	F-stat.	p-value
FTF vs. CMC	1	.007	.28	.600
CMC vs. IND	1	.096	3.58	.068
FTF vs. IND	1	.043	1.60	.215
FTF&CMC vs. IND	1	.088	3.26	.081

Panel C: Judgment Efficiency: Percent Return Model

Source	df	MeanSq.	F-stat.	p-value	R-Square
ΔPV%	2	4,672.31	11.289	.000	.421
Error	31	413.86			
Total	33				

Panel D: Judgment Efficiency: Percent Return Treatment Contrast

Source	df	MeanSq.	F-stat.	p-value
FTF vs. CMC	1	7,147.87	17.27	.000
CMC vs. IND	1	6,349.13	15.34	.001
FTF vs. IND	1	44.61	0.11	.750
FTF vs. CMC&IND	1	1,634.58	3.95	.056

Notes
FTF = onshore, traditional face-to-face teams with immediate reciprocity
CMC = offshored teams that use e-mail to communicate, delayed reciprocity
IND = individuals in the control group acting alone, no reciprocity

ΔPV% = pro-forma earnings growth rate = $\Delta PV\% = \frac{PVEBT_{t+1} - PVEBT_t}{PVEBTt}$

Where PVEBT is the pro-forma present value of earnings before taxes

MINUTES = Amount of elapsed time to make judgment

APPENDIX

Technofind Technologies traditionally reinvests 95% of their total Net Income. It appears that the average interest rate over the next two years will be 4%. They are requesting funds to complete several projects over the next two years. Specifically, they intend to purchase $500,000 of manufacturing equipment, spend $200,000 to hire more manufacturing employees, hire a new salesperson for $75,000, increase Research & Development by $400,000, and improve plant space with $65,000.

You are one of three accounting managers of a newly formed venture capital firm. Your job is to work with the other accounting managers to calculate the funding needs of all businesses that apply for funding and recommend one of the businesses to receive your firm's venture capital funding. All of the applicant companies have been working fervently over the past two years to design a chip for handheld telecommunication equipment like mobile phones, personal digital assistants, and laptop computers that would allow EMS and law enforcement agencies to locate these items by satellite in the case of 911 emergencies. To date, no company has succeeded but your venture capital firm wants to get involved because your firm believes that it is only a matter of time before one of the companies is successful and this market will be lucrative.

Blank forms are provided for each business that will enable you to perform the necessary calculations. **First**, use the Pro-forma income statements to identify the funding needs of each business and then calculate the Return on Investment, Residual Income, Accounting Rate of Return, Payback Period Ratio, and Net Present Value for each business. **Second**, please work as a team and answer the two questions below.

1. Which firm if any, would your team recommend for funding?
2. If your team recommended a firm, please explain why your firm chose that particular firm.

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