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Beyond user acceptance: The determinants of the intention to produce user created contents on the internet

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BIASED PROJECT STATUS REPORTS: A SURVEY OF IS PROFESSIONALS

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Abstract

This paper summarizes an empirical investigation that explored biased project reporting by Information Systems (IS) professionals. The study is based on a survey of 91 professionals who were involved with system implementations in various governmental agencies. Our investigation assessed the impact of project importance, control, structure, and size on biasing behaviors. To formulate the research hypotheses for our study, we adopted a Message Exchange Perspective. The results reveal that IS professionals are more likely to bias their project status communications when working in projects that are (1) large, (2) important, and (3) lack controls. The practical and research implications of our findings are discussed.

Keywords: Information systems development, project reporting, biased reporting.

1 INTRODUCTION

Recent empirical evidence has highlighted an important impediment to the effective management of information system (IS) development initiatives: inaccurate project status reports (Iacovou, 1999, Snow and Keil, 2002b, Snow and Keil, 2002a, Snow et al., 2007, Smith and Keil, 2003, Keil et al., 2004, Keil et al., 2007). *Project status reporting* refers to the communication of information about the status of a project to interested decision makers, such as project managers, sponsors, and auditors. Typically, in such updates, the reporter compares the state of the project versus expectations in a project plan, and identifies issues that may cause problems in its completion. Without accurate status reports, project executives are unable to direct their projects effectively, allocate resources efficiently and respond to problems in a prompt fashion (Thompson et al., 2007).

The research stream that investigated the presence of inaccurate status reports in IS initiatives identified two sources of misreporting. The first source is *reporting error* and it refers to unintentional inaccuracies and omissions that the providers of status updates make due to cognitive and information processing limitations. The second source is *reporting bias* and refers to the deliberate distortion of project status updates by such reporters (Snow and Keil, 2002a). While we recognize the importance of both sources of misreporting, the focus of our investigation is on bias. Specifically, we focus on the set of behaviors that an individual pursues in order to convey an impression of the project status to his/her supervisor that it is different from the one that is actually perceived by him/her.

Biased status reports in IS projects seems to be a significant issue. In a survey of 56 project managers, Snow et al. (2007) found that bias was employed in 60% of the reports. And in surveys of 485 IS project managers and 210 project participants, Thompson et al. (2007) found that status reports are frequently "less than perfect" and that biased reporting is associated with poor project outcomes. Given the occurrence and negative impacts of biased reporting, our investigation aims to identify the types of projects that are prone to such biasing. The research question that frames our work is: *how do project characteristics influence the propensity of project participants to bias their status reports?* To address this question, we adopt the Message Exchange Theory (MET) to provide a conceptual foundation for our investigation. To the best of our knowledge, this is the first empirical attempt to identify project traits that affect biasing in project reporting.

The rest of the paper summarizes our investigation. In the next section, we review prior organizational communications and IS literature to summarize MET and relevant empirical findings. This is followed by a summary of our research model and the hypotheses that support it. The research methodology that we employed to carry out the investigation is described next. We conclude the paper by discussing the study's findings, limitations and implications.

2 A MESSAGE EXCHANGE PERSPECTIVE OF BIASED REPORTING

The Message Exchange theory (MET) considers communications as message exchanges within dyads of organizational actors; for an overview of the theory, see Stohl and Redding (1987). A major research stream in MET deals with the study of deliberate misreporting in hierarchical dyads (Read, 1962, Fulk and Mani, 1986, Mellinger, 1958, Jablin, 1979, Roberts and O'Reilly, 1974, Athanassiades, 1973, Chow et al., 2000). Given the consistency between the scope of the MET theory and the focus of our work, we decided to adopt it as the conceptual foundation for our investigation.

The MET proposes that messages can serve various functions in organizational settings. For example, they can be used to provide directions, to establish and nurture relationships, and so on. A predominant purpose of such messages is to serve to attain specific goals (Fulk and Mani, 1986, Stohl and Redding, 1987, Jablin and Sussman, 1983). Thus, while full disclosure may be desirable from the perspective of facilitating project management, the MET posits that such disclosures may be

inconsistent with the needs or goals (such as a desire to further their own careers, to secure resources for their work tasks, etc.) of the message senders. Depending on the situation, reporters may prioritize their needs-goals higher than the need to provide accurate and complete information to others (Read, 1962, Tesser and Rosen, 1975, Pfeffer, 2004, Grover, 2005). Consequently, biased reporting will occur in the transmission of reports in organizational settings (Read, 1962, Grover, 2005, Fulk and Mani, 1986, O'Reilly, 1978, Roberts and O'Reilly, 1974, Keil and Robey, 2001).

A variety of communication techniques can be pursued to bias reports, such as the alteration or withholding of relevant status information (Keil and Robey, 2001, Smith and Keil, 2003, Snow and Keil, 2002b). In our context, *alteration* refers to the misstating of the condition of project activities and/or the magnitude and causes of problems (or achievements). *Withholding* refers to the deliberate omission of relevant facts or issues that are related to the state of project activities (Fulk and Mani, 1986, O'Reilly, 1978, Roberts and O'Reilly, 1974, Bavelas et al., 1990, Athanassiades, 1973).

A recent study (Snow et al., 2007) identified several motivations that might lead reporters to offer biased status updates in IS projects. The study found that biased reporting could arise both from self-serving motivations (to further the reporter's own goals) and project-supporting motivations (to increase the likelihood of success for the project). According to the study, reasons cited for biasing included: 1) a fear of communicating bad news (because of a risk that executives might "shoot the messenger"); 2) a desire to make the reporter look good or to avoid looking bad; 3) a belief that project problems could be overcome in the end; and 4) a desire to avoid letting others down. Other reasons for biasing included the reporters' desire to secure slack resources for their project, concerns about the team's ability to meet the project's goals, or a hope to be perceived as a "hero" who turned around a troubled project.

While the MET recognizes that biased reporting may provide perceived benefits for the reporter or the project, it is important to acknowledge that such biased disclosures are risky (for the reporters) and are likely to result in negative consequences if they are detected. Therefore, biasing is more likely to occur when (1) the expected benefits of biased reporting are high, and (2) the risk of detection and expected severity of reprimand are low. This assumption is supported by the findings of prior research, which illustrated that selective reporting is more likely under conditions of information asymmetry (Baiman, 1990, Keil et al., 2000). Consistent with this prior research, we expect that reporters in IS projects will recognize the risky nature of biasing, as the recipients of their reports are likely to view biasing unfavorably (even when well-motivated) as it hinders their ability to monitor and lead the project effectively. Consequently, we expect that project conditions that enhance the perceived benefits of biasing (to reporters or projects) and minimize its risks will increase the likelihood of misreporting in status reports.

3 RESEARCH HYPOTHESES

Based on our review of the IS project management literature, we identified four project factors that are likely to be significant in terms of their influence on biasing in project reporting. These factors are: project importance, structure, control, and size. We decided to focus our investigation on these four factors because (1) they appear to be salient to the arguments of the MET-based perspective and (2) they have been shown to impact both project outcomes and communications (Barki et al., 2001, Henderson and Lee, 1992, McFarlan, 1981, Francalanci, 2001) suggesting that they may be affecting project results through their influence on reporting. By investigating the influence of these factors, we are hoping to identify the types of projects that are prone to biasing. To identify the role that these factors play with respect to biased reporting, we use MET-based arguments to derive the hypotheses that form our research model (see Figure 1). Each hypothesis is described next.

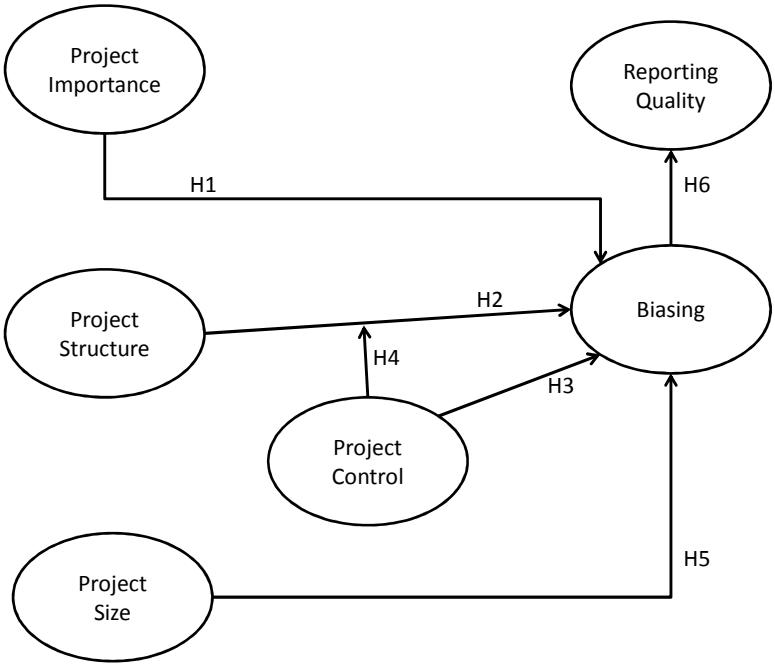

Figure 1. Research Model

Project Importance: Importance refers to the significance that the organization places on the system under development (Barki et al., 2001). It is determined by its strategic potential and the operational value of the system. Importance is likely to increase the likelihood of biasing because it enhances the potential benefits that can be accrued to reporters who engage in effectual misreporting. When faced with bad news in major undertakings, reporters will be more likely to hide problems in order to avoid the negative political repercussions that may be delivered to those associated with the project or those that deliver negative assessments (Iacovou, 1999). Likewise, the political benefits to those seen as responsible for the success of a significant project are likely to be more consequential (Keil, 1995). In sum, we expect that biasing is likely to yield higher rewards in important projects. Consistent with this assertion, Bean (2001) found empirical support for the relationship between project importance and distortion. Thus, we anticipate that *participants in high importance projects will bias their reports more frequently than those in low importance ones (*Hypothesis 1).

Project Structure: Structure refers to the level of preciseness and stability in the specifications of the desired project deliverables (McFarlan, 1981, Nidumolu, 1995). Low structure projects experience a lack of specificity in the system requirements and frequent changes to them over the course of the project; high structure projects, on the other hand, have clearer and more stable requirements (Nidumolu, 1996, Lee and Xia, 2002). Biasing is more likely to occur in low structure projects because ambiguity and dynamism make it more difficult for report recipients to detect it, which in turn makes it a less risky behavior. Further, the unclear specifications of a low structure project are likely to intensify the difficulty of project management, making it more difficult for supervisors to monitor the progress of project work (Campbell, 1958). When faced with conditions of unstructured requirements and dynamism, even experienced managers must rely on the specialized expertise of team members to gauge progress and direct the project, which makes biasing less likely to be detected and scrutinized. Thus, we assert that *participants in low structure projects will bias their reports more frequently than those in high structure projects* (Hypothesis 2).

Project Control: Control refers to "the set of mechanisms designed to motivate individuals to work in such a way that desired objectives are achieved" (Kirsch et al., 2002). The introduction of structured

controls in a project is likely to decrease the incidents of biasing as it will make their potential detection more likely (and thus will make biasing more risky). Misrepresentation and omission of project facts from status reports will be more difficult to cover when specific metrics and templates must be used by participants to communicate the status of their activities (as dictated by control methodologies). Because of this, we anticipate that project participants would be less likely to engage in misrepresentations when their work is closely controlled. Pinto and Mantel (1990)'s findings lend support to this argument. They found that the use of schedules, plans, and other control mechanisms was associated with better communication and improved trouble-shooting. Research showing that the use of control tools in IS projects positively impacts their performance (Henderson and Lee, 1992) is also consistent with this assertion. We therefore propose that *participants in projects with lax controls will bias their reports more frequently than those in projects with stricter controls* (Hypothesis 3).

In addition to their direct effects, the above two factors (project structure and control) are likely to have an interaction effect on biasing. Specifically, we argue that the effect of structure will be moderated by the impact of control. In other words, for low structure projects, we assert that the use of controls will be important in reducing biasing; the use of similar controls will not be as important (for biasing detection) in high structure projects --as the specific nature of the project requirements will deter the likelihood of biased reports. The interaction effect between control and structure is supported by prior empirical work (Nidumolu, 1995) which demonstrated that dimensions of these two constructs affect the residual performance risk in an IS project and that their "fit" affects project outcomes. Thus, we hypothesize that *the effect of project structure on biasing will be moderated by project control* (Hypothesis 4).

Project Size: Size refers to the magnitude of the resources that are needed to complete the project. Past research illustrates that the level of resources is affected by the complexity of the development initiative (Baccarini, 1996, Holtta-Otto and Magee, 2006, Francalanci, 2001). In general, biasing can be both more beneficial and less risky in large projects. Using biased reports to avoid delivering bad news can be more desirable because in projects that consume high levels of organizational resources the risk of potential scape-goating (i.e., shooting the messenger) can be consequential. Likewise, other benefits of biasing (such the ability to be seen as a hero who rescued a project) are likely to be more important in larger, more expensive undertakings. In terms of detection risk, the ability of report recipients to detect inaccurate status updates in large projects is diminished as the complexity (i.e. the diversity and volume of work tasks) increases (Holtta-Otto and Magee, 2006). Given that biasing is likely to yield higher rewards in larger projects and may be more difficult to detect, we anticipate that *participants in large projects will bias their reports more frequently than those in small projects* (Hypothesis 5).

While the focus of our work is on biasing *behaviors*, we recognize that prior work in IS project communications (Thompson et al., 2007) has focused on a related, yet distinct construct: quality of project reporting. *Quality of project reporting* refers to the extent that project updates are complete, accurate, timely and informative to their recipients. Although biasing behaviors have a degrading effect on the quality of reporting, they are not the only factors that influence the quality of status updates that are produced in a project (Muller, 2003). Such other factors include the reporting experience, communication skills and other traits of the reporter, limitations of the report transmission media (face-to-face meetings versus email updates, for example), the frequency of reporting, and so on. While it is not our intent to develop an exhaustive model that attempts to explain all the antecedents of reporting quality (for a comprehensive review of misreporting antecedents see Smith and Keil, 2003), we incorporate one final hypothesis in our model to depict the distinction between biasing behaviors and reporting quality: *the frequency of biasing will be negatively associated with reporting quality in a project* (Hypothesis 6)

In the next section, we describe the sample and the methodology that we utilized to empirically assess the validity of our hypotheses.

4 RESEARCH METHODS

Sample: The sample for this study consisted of people who were team members in state governmental projects in an Eastern state in the U.S.A. The data collection for this study took place as part of a larger effort to study biased project reporting involving interviews and surveys with project personel, auditors and other involved executives. We selected a diverse subset of projects based on several dimensions (project duration, vendor involvement, etc.) from a listing of all major on-going projects that were being pursued by state agencies. The data that was used to assess our hypotheses were collected using survey questionnaires that were sent to all non-executive IS participants in each of the selected projects. 203 surveys were mailed, and two reminders were emailed to each subject. Ultimately 130 participants responded, yielding a gross response rate of 64%. Of these, 39 cases were removed because of missing data. We embraced an intentionally conservative algorithm in deciding which cases should be removed: a case was removed if the respondent did not complete two or more of the items for any construct. This left 91 usable responses, with a net response rate of 45%.

Scope: The respondents were instructed to answer the questions within the context of a specific IS project: the project on which the participant was currently spending most of his or her time. Moreover, they were instructed to focus on their status reporting to their project manager when responding to questions that were related to biasing and reporting quality. Thus, our data collection focused on the "IS professional to the project manager" reporting dyad.

Measures: Where possible, we used previously developed and validated instruments to measure the constructs of interest. To measure frequency of biasing we used five measures (see Table 1 below): two were adapted from Fulk and Mani (1986), one was taken from Roberts and O'Reilly (1974), and the remaining two were created by the authors.

Questions	Scales (seven-point Likert)
Please indicate your level of agreement with the following statement: "There are significant forces in this project that cause me to distort information in some of my communication to the project manager"	Strongly disagree... Stongly agree
About how often during a typical work week do you withhold information from the project manager that might be useful to him/her?	Virtually never... Very frequently
How frequently do you find it necessary to omit particular project status facts from the information you pass on to the project manager?	Virtually never... Very frequently
Of the total amount of project information you receive, how much of it must be actively changed in some way before you pass it on to the project manager?	Virtually none... A great deal
How frequently do you find it necessary to alter the contents of your progress reports (either verbal or written) to fit the project manager's expectations?	Virtually never... Very frequently

Table 1: Measures of Bias in Project Reporting

To measure reporting quality, we used Mohr and Spekman's (1994) communication quality scale, which measured communication timeliness, accuracy, adequacy, completeness and credibility. (For space reasons, only the measures for bias are included in this paper, but the others are available from the authors upon request). For project importance, we used the 8-item scale developed by Barki et al. (2001). Following their approach, we summed the responses from the 8 items to create a summated index for importance. For project size, we asked the respondents to report the total budget for the

project. Project structure was modeled as a higher-order construct, with two separate but related dimensions; requirements instability and requirements diversity. Taken from Nidumolu (1995), four items were used to measure requirements instability, and three for requirements diversity. We also modeled project control as a higher-order construct, with internal integration and formal planning as the two dimensions. Four items measuring internal integration and three measuring formal planning were taken from Barki et al. (2001). To assess the impact of biasing on reporting quality in a more accurate fashion, we included a control variable in our instrument (frequency of reporting). To measure this control factor, we created three new items (these were modeled after a frequency of reporting measure from Roberts and O'Reilly, 1974 which we felt lacked face validity within this research context). All new items in our instrument were validated using a card-sorting technique as described in Moore and Benbasat (1991).

For data analysis, we utilized the Partial Least Squares (PLS) technique: specifically, PLS-Graph version 3.0 (Chin and Frye, 2001). Table 2 shows the loadings of multi-item indicators on the constructs they are intended to measure, as well as the cross-loadings on other constructs.

Construct	Indicator	RB	RQ	RI	RD	II	FP	FR
Reporting Bias	RB1	.57	-.28	.11	.24	-.16	-.08	-.01
	RB2	.84	-.45	.09	.21	-.20	.00	-.18
	RB3	.80	-.38	.04	.10	-.24	-.34	-.33
	RB4	.89	-.42	.04	.12	-.13	-.13	-.16
	RB5	.71	-.24	.10	.12	-.12	-.07	-.15
Reporting Quality	RQ1	-.48	.81	.05	.02	.24	.24	.28
	RQ2	-.40	.91	-.03	-.10	.13	.13	.29
	RQ3	-.41	.92	-.02	-.06	.08	.22	.25
	RQ4	-.34	.93	.00	-.03	.07	.12	.18
	RQ5	-.41	.84	.01	-.03	.14	.09	.23
Requirements Instability	RI1	.02	.05	.78	.58	.01	-.04	.13
	RI2	.05	.01	.90	.65	-.09	-.18	.10
	RI3	.20	-.10	.82	.57	-.16	-.16	-.05
	RI4	.05	.05	.77	.64	-.23	-.05	.03
Requirements Diversity	RD1	.15	-.04	.70	.86	-.20	-.13	.05
	RD2	.11	.04	.60	.83	-.05	.03	.18
	RD3	.27	-.11	.57	.84	-.23	-.06	.00
Internal Integration	II1	-.13	.06	-.14	-.23	.83	.16	.28
	II2	-.24	.10	-.12	-.22	.68	.34	.20
	II3	-.17	.12	.01	.03	.69	.49	.43
	II4	-.16	.18	-.20	-.19	.89	.29	.46
Formal Planning	FP1	-.17	.17	-.29	-.24	.45	.80	.33
	FP2	-.07	.20	.05	.11	.25	.80	.41
	FP3	-.13	.08	-.03	.01	.29	.84	.27
Frequency of Reporting	FR1	-.14	.17	.04	.09	.28	.36	.83
	FR2	-.14	.17	-.03	.07	.27	.33	.75
	FR3	-.24	.24	.02	.09	.35	.29	.88

Table 2: Indicator Loadings and Cross-Loadings

For adequate item reliability, ideally the item loadings should be higher than .70, although slightly lower loadings for individual items are usually acceptable providing other items measuring the construct are greater than .70. The only item that appears to be potentially problematic is the first measure of reporting bias, RB1, which displayed a loading of .57. After reviewing this item from a face validity basis, we decided to retain it in an effort to capture as much of the meaning of the reporting bias construct as possible. (As an aside, we tried re-running the model without this item and

observed no significant differences in the results obtained).

To assess scale reliability and internal consistency, we computed the Composite Reliability (CR) score (similar to Cronbach's alpha) and the average variance extracted (AVE). For adequate reliability, the CR score should be greater than .70 (or .80, for more mature streams of research). All of our CR scores exceeded .80. In addition, the AVE scores ranged from .59 to .78, comfortably exceeding the recommended level of .50. The CR and AVE scores are shown in Table 3.

For discriminant validity, two tests were performed. First, the cross-loadings of the items were examined, to ensure that: 1) each item loads more highly on its own construct than on any other construct, and 2) there are no items that load more highly on a construct than the items intended to measure that construct. All measures passed this test. Second, we compared the square root of the AVE for each construct to ensure it was greater than the correlations between that construct and all other constructs (see Table 3). All measurement scales passed this test as well.

Construct	CR	AVE	RB	RQ	RI	RD	II	FP
RB	.88	.59	.77					
RQ	.95	.78	-.47	.88				
RI	.89	.67	.10	.00	.82			
RD	.88	.71	.21	-.05	.74	.84		
II	.86	.61	-.22	.15	-.14	-.19	.78	
FP	.85	.66	-.16	.19	-.13	-.07	.41	.81

Note: CR – composite reliability score; AVE – average variance extracted; RB – report biasing; RQ – report quality; RI – requirements instability; RD – requirements diversity; II – internal integration; FP – formal planning. For adequate discriminant validity, the diagonal elements (i.e. square root of AVE) should be larger than the off-diagonal ones.

Table 3: Tests of Reliability and Discriminant Validity.

Satisfied that the measures were adequate, we then examined the structural model results. These are shown in Figure 2. Note that we have expanded this model from the earlier research model, to show the higher-order constructs (project uncertainty and project control) with their separate dimensions, as well as the interaction term (Uncertainty X Control) that was added to test for a moderating influence of control on uncertainty (see hypothesis 4). Finally, in addition to the control variable of reporting frequency, we also added the influence of project size on importance as a control (as those two factors are likely to be related). Table 4 summarizes the results with respect to our tests of hypotheses.

Hypothesis	Relationship	Path Estimate	t-statistic	Supported?
H1	Project Importance → Biasing	.31	3.18	Yes
H2	Project Structure → Biasing	.07	0.80	No
H3	Project Control → Biasing	-.35	2.80	Yes
H4	Control moderates Structure → Biasing	.09	0.77	No
H5	Project Size → Biasing	.22	2.52	Yes
H6	Report Biasing → Reporting Quality	-.43	3.56	Yes
Control				**Significant?**
	Reporting Frequency → Quality	.19	1.88	$p < .10$
	Project Size → Importance	.27	2.95	$p < .05$

Table 4: Results of Tests of Hypotheses

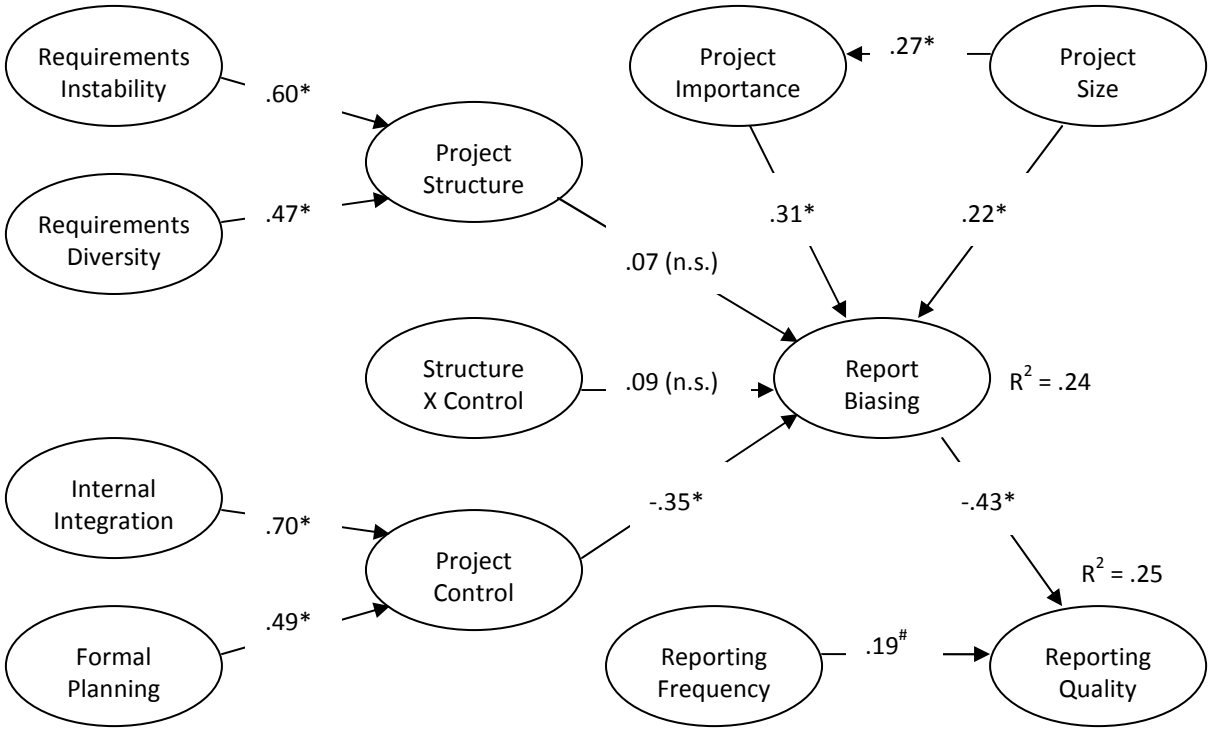

Figure 2: Results of Structural Model Analysis

** significant at p < .05; # significant at p < .10*

5 DISCUSSION OF FINDINGS

We note from Figure 2 that the amount of variance explained (R^2) in biasing was .24 indicating that a substantive portion of the variation in biasing behaviors can be explained by the project factors that were identified as antecedents in our model. Moreover, the variance explained for reporting quality was .25, and the path estimate from biasing to reporting quality was -.43, suggesting that the frequency of report biasing does have a substantive, negative impact on report quality. This confirms that understanding the factors that influence report biasing is indeed important.

With respect to the effects of the antecedents, three of the four factors hypothesized to influence biasing (project importance, control and size), did in fact do so. As hypothesized, it appears that participants in more important projects are more likely to engage in biasing behaviors. Similarly, in larger projects the participants are more likely to bias their reports. In contrast, the more perceived control over the project, the less frequently biasing will occur.

As our results indicate, the degree of project structure did not have an influence on the frequency of report biasing. We had hypothesized that the more uncertainty that existed in project requirements (both in terms of the diversity and variability of requirements), the more that biasing would occur. Our rationale was that low structure projects would have more ambiguity and dynamism, making biased reporting more difficult to detect, and hence participants would see it as a less risky behavior and tend to bias more. Our results did not support this hypothesized relationship. One possible explanation is that the degree of structure was average, not low, in the projects that were included in this sample. An examination of the descriptive statistics for the seven indicators measuring requirements diversity and instability revealed that the means ranged from 3.5 to 4.5 (on a 7-point scale), suggesting that this might have had a dampening effect. One reason for the presence of a higher level of structure (across all projects in our sample) is that the state that was the focus of our data collection effort required all of its major projects to undergo a certification review before receiving funding. Moreover, the state required periodic reviews for such projects. Thus, it is possible

that these reviews compelled agencies to structure their projects (and reduce variability in requirements) in a way that is not typical in other environments. We also recognize the limitations of using interval scales when testing for interaction effects (hypothesis 4). We tried running the PLS model without the interaction effect, and found adding it only increased the variance explained by a nominal amount, and hence we conclude there was no evidence of an interaction.

6 LIMITATIONS AND IMPLICATIONS

Before discussing the practical and research implication of our findings, there are several limitations with this study which need to be acknowledged. First, our data was cross-sectional in nature, which does not allow us to truly test for causality. While we can propose directionality in relationships based on previous research, our data and statistical analyses can only detect correlations and not causation. Nevertheless, it is important to recognize that the associations that we have identified among the constructs of interest are consistent with the causal relations in our chosen theory. Second, our sample was taken from participants involved with projects at state governmental agencies. As such, we cannot generalize the results outside of that context without caution. Third, while we took several steps to enhance and assess the validity of our measures, a couple of measurement issues exist. Specifically, project size was measured with a single indicator and new items were used in measuring three of our constructs.

Despite the above limitations, we believe the results from this study provide interesting implications for both practitioners and researchers. For practitioners, our work has confirmed empirically that biased reporting exists in IS projects and that such biasing is likely to be affected by three dimensions of the project itself: its size, importance and use of controls. Our findings indicate that risk of biased reporting gets amplified as the size and importance of the undertaking increases. Thus, managers who are tasked with the oversight of large and/or important projects will be well advised to pursue tactics that could reduce the potential benefit of biasing and increase its probability of detection. Such tactics include regular communication audits, the use of multiple sources to triangulate the exact state of project tasks without relying of a single source, and the nurturing of an open project communication culture that minimizes the need for face saving behaviors. As the pursuit of such tactics is likely to require substantial resources and time, we advise project executives to focus on high biasing-risk projects when identifying initiatives that could benefit from the use of such measures. Moreover, it is important for such executives to recognize that the potential for increased biased reporting can be countered through the use of normal project control activities, such as internal integration efforts (e.g. regular project meetings) as well as formal planning techniques (such as project management methodologies and software). Our empirical findings have confirmed the suppression effects of such controls on biasing.

Finally, our study's findings yield several opportunities for further research. First, it would be interesting to see whether the lack of an influence of project structure on biasing would hold in a different sample that included more low-structure projects. Perhaps there is a necessary threshold with respect to project structure that has to be reached before it begins to influence biasing behavior. Second, our results were obtained from projects undertaken by governmental agencies. While we anticipate that the findings would hold across projects drawn from the for-profit sector, it would be useful to replicate the study in a different (non-governmental) context to confirm this assumption. Third, our study's sample consisted of IS professionals acting as project team members reporting to their project manager. It could be fruitful to see if similar reporting behaviors exist in other dyads that are present in project settings (when a project manager reports to an auditor, for example). Fourth, now that we have established that project characteristics do influence the propensity of reporters to bias their status updates, it would be useful to identify additional project traits that could complement the set of the four that we have identified. This will yield a more comprehensive perspective on the effects that project environments have on biasing.

In conclusion, our research findings have confirmed that biasing is indeed present in IS projects and has identified three project characteristics that influence it. We hope that the results of our study will guide practitioners in improving their project monitoring and oversight practices and will provide fruitful exploration avenues to researchers who are interested in helping such executives. Only with such additional scholarly explorations will we be able to gain a complete understanding of the biasing phenomenon and find ways to reduce its undesirable effects.

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