The Nerd Effect: Communication and Managerial Self-Image

Completed Research Paper

Kevin Craig
Zicklin School of Business,
Baruch College, CUNY
55 Lexington Avenue
New York, NY 10010 U.S.A.
kcraig@baruch.cuny.edu

Varun Grover
Department of Management
Clemson University
Suite 132F, Sirrine Hall
Clemson, SC 29634 U.S.A.
vgrover@clemson.edu

Abstract

A fundamental aspect of IT-Business alignment rests on good communication between business managers and IT personnel. Managers need to obtain useful technical information to support strategic IT decisions and must communicate with IT workers to do so. However, we argue that managers' preconceived perspectives of IT experts (as "nerds") can have an effect on communication between managers and IT workers. This research examines business-IT communication between managers and IT workers. The nerd effect causes managers to surrender control over a business-IT communication to an individual perceived as a nerd. Under these circumstances, the traditionally positive relationship between control over a communication and the success of that communication is inverted. Results from a quasi-experiment provide evidence that the nerd effect has the power to affect and possibly undermine the communication upon which business-IT strategic alignment relies.

Keywords: Communication, Strategic Alignment

Introduction

A fundamental aspect of Business-IT alignment is good communication across the business and technical domains. Strategic information technology (IT) decisions are informed by technical knowledge (Preston and Karahanna 2009) – and the managers, who make these decisions, rely on technical staff to inform them about technology. Thus, the development of technical knowledge among managers depends heavily upon communication with IT personnel (Coughlan et al. 2005).

Unfortunately, in many cases a chasm exists between the world of the business manager and the world of the technologist, and communication problems between business-oriented individuals and IT staff are a persistent problem for industry (Shuraida and Barki 2013). Often, sub-optimal strategic IT decisions are made because there is insufficient effort made by managers to communicate with their IT-oriented colleagues (Kilov and Sack 2009). In this paper, we argue that this difficulty may be caused by managers' discomfort with IT experts and their expertise. The social awkwardness popularly associated with IT expertise is not compatible with the ideal managerial self-image. In other words, managers perceive IT expertise as "nerdy" and, as such, not something they would like as part of their self-image. Thus, the manager may seek to avoid behavior that is indicative of IT expertise. Research in the field of education has uncovered a persistent "nerd" stereotype associated with IT work. The nerd is a workplace identity and is associated with social awkwardness (Guzman and Stanton 2009). As a result, the desire to not be a nerd has caused individuals to avoid learning about IT (Myers and Beise 2001).

As a known factor of IT-related learning behavior, the association of nerds with IT knowledge disrupts manager/IT staff communication and may thus undermine the strategic IT decision process. To put it simply, a) managers associate IT expertise with nerds, b) managers associate nerds with social awkwardness, and c) this association causes managers to withdraw from business-IT communication. This is what we call the "nerd effect," and we argue that it is a significant factor that may harm the communication that is fundamental to good alignment. Our research questions: *does the "nerd effect" exist, and what effect does the "nerd effect" have on managers' motivation to learn about IT?*

We do NOT assert that managers do not want to learn about IT in detail. This paper addresses the issue that, *despite* the honest effort of managers to communicate with IT staff and learn about IT, communication to support technical decisions is often severely flawed (Stibel 2012). Incomplete communication and inadequate analogies presented to managers from technical colleagues have been blamed for numerous failures, including some as dramatic as design errors at NASA (Leidner and Kayworth 2006). The nerd effect may explain why managers may avoid deep IT communication before acquiring the broad, but useful, abstract knowledge that they need to make good strategic IT decisions.

Our paper progresses with a discussion of the nature of strategic IT decisions and why communication is important for them. Then, we explain the nerd stereotype along with image theory as the basis for our work. This is followed by the development of a model and a detailed description of a quasi-experiment designed to test this model. Finally, we offer a discussion of how the nerd effect may inform theory and offer guidance to practice.

Background

The nature of the strategic IT decision determines the necessary characteristics of business-IT communication, so below, we present characteristics of the strategic IT decision as relevant to business-IT communication. We follow that by describing the theoretical foundation of this paper: image theory.

Strategic IT Decision

This paper is bound by a specific business context: communicating the technical information managers need to support the strategic IT decision. Anthony's (1965) classic work defines a strategic decision as a decision regarding the acquisition or mobilization of resources to attain the objectives of the firm. Anthony's description is appropriate for this research because it has been used to identify the nature of information required for strategic decisions (Gorry and Morton 1971). Strategic IT decisions that involve IT resources and can be defined as:

> *a decision that governs the acquisition or mobilization of information technology resources to attain the objectives of the firm.*

The strategic IT decision has six characteristics common to all strategic business decisions. First, it focuses on the objectives of the organization. Specifically, it focuses on how to acquire and mobilize resources to attain objectives (Anthony 1965). Second, the person who makes the strategic decision, and is responsible for its consequences, is the manager (Sprague 1980; Chen et al. 2010). Third, the strategic decision is "greatly influenced by the departments processing relevant knowledge and skills" (Sabherwal and King 1995; Snyman and Drew 2003; Alexiev et al. 2010). In other words, the strategic decision involves both managers and subject matter experts; in this case, the subject matter is IT, and the subject matter experts are IS personnel (Kearns and Sabherwal 2007). Thus, "IS personnel play an important role by providing expertise in the dynamic and complex information technology" (Sabherwal and King 1995). Fourth, the strategic decision involves "a small number of high-level people who operate in a non-repetitive and creative way," (Anthony 1965; Chen et al. 2010). Managers approach a strategic decision as an unstructured decision. When managers approach a strategic decision, they benefit less from specific prior experiences, because each strategic decision opportunity is a novel situation (Sabherwal and King 1995; Eisenhardt 1997; Elbanna and Child 2007). Fifth, strategic decisions are supported by a broad level of often-aggregated information. This broad understanding must be grounded in an accurate characterization of technical details so that the manager is aware of the trade-offs between his or her options in each context and timeframe (Gorry and Morton 1970; Elbanna and Child 2007; Chen et al. 2010). Sixth, such decisions involve risk to the organization (Sabherwal and King 1995; Snyman and Drew 2003; Chen et al. 2010).

In addition to the characteristics common to all strategic decisions, the strategic IT decision is marked by its special place at the intersection of business strategy and IS strategy. IS strategy is determined by managers who rely upon information and alternatives formulated by IS personnel, who draw upon their experience and expert knowledge (King 1978). The strategic IT decision depends on the manager communicating with IS personnel, with the manager providing context information, such as the business strategy, to the IS personnel, and the manager ultimately receiving contextualized IT knowledge that can be used to make a decision.

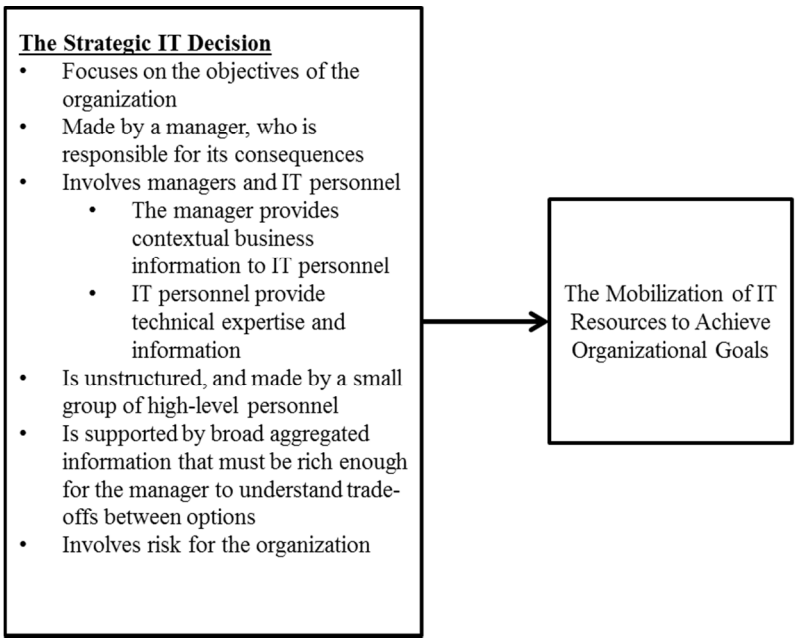

Figure 1: Characteristics of the Strategic IT Decision

The Nerd Stereotype: An Impediment to Communication in Strategic IT Decisions

The success of strategic IT decisions depends heavily on the ability of managers to drive and sustain a communication effort about IT until they are ready to act. However, managers may stop communicating and take action as soon as they feel that they have "enough" knowledge; this is often premature (Eisenberg 1978). Advice-seeking by management is a social interaction (Jansen et al. 2008), and can thus be influenced by social factors that affect communication (Dulipovici and Robey 2013). It is our contention that the association of social awkwardness with IT experts is a factor that inhibits managers from learning about IT to the extent required to make an optimal decision. There is evidence from the field that such an association exists and does indeed affect communication and learning (Soper, T. 2013; Zhang, Q. 2010).

Workers who are technically oriented tend to be thought of as "nerds." Social science literature has recognized the nerd stereotype as a stable and legitimate factor influencing behavior. While the conceptualization of the nerd may change superficially across time and cultures (Gulz et al. 2007), several core characteristics of the nerd remain universal. In the popular imagination, nerds are generally un-athletic, use technical jargon, and focus on technical issues instead of the emotions and perspectives of others (Gulz et al. 2007). While people may be impressed with the technical skills of nerds, they do not want to become nerdy, and that fact has driven many individuals away from technical training (Green and Ashmore 1998; Myers and Beise 2001; Bishop et al. 2004). In the workplace, the nerd is an occupational identity; IT personnel perceive themselves as nerds, and are perceived by others as nerds (Fagnot et al. 2007; Guzman and Stanton 2009).

The nerd stereotype, like all stereotypes, is a heuristic, used by people to categorize other people quickly and thus infer things about them with minimal effort. Certainly, not all IT workers are nerds, but many

are, and nerds are strongly associated with IT work, and not with the people-centric work associated with management (Fagnot et al. 2007; Guzman and Stanton 2009).

Image Theory

Learning about IT may pose special challenges to managers because of the special nature of IT expertise and the personal characteristics often associated with IT expertise. Knowledge and communication skills are key elements of how managers view themselves. When managers are in a situation that requires them to learn about IT on a deep level, they may feel conflicted. The conflict arises from the negative social image associated with IT expertise (the nerd stereotype), which is not compatible with the characteristics associated with managerial individuals. Thus, the process of informing a strategic business-IT decision may fall prey to the forces described by image theory, which deals with how individuals react to potentially negative self-images. Therefore, good communication (the processes of conveyance and convergence) must be considered in the light of these two theories.

Beach and Mitchell originally developed image theory as a model for explaining decision-making behavior (Beach and Mitchell 1987). According to image theory, people develop possible future self-images that reflect their ideal future situation (who they want to be), and evaluate their forecasted self-images against their existing values and goals (Beach and Mitchell 1987). Image theory has appeared in IS research, specifically to explain technology adoption. It has been demonstrated that individuals evaluate the compatibility of becoming a user of an IT with their ideal self-image when deciding whether or not to adopt that IT (Venkatesh and Davis 2000).

In the workplace, there is a sharp contrast between the inferences that come with the nerd stereotype and the characteristics associated with managerial leadership. Table 1, below, contrasts the characteristics of the nerd with the personal characteristics that are widely associated with managers (from Penley et al. 1991, and Schein 1973). This contrast is the source of the "nerd effect." Managers learning about IT to inform strategic decisions must engage and control IT-related communication. This may fail a compatibility check with the manager's ideal self-image. Thus, they may withdraw and discontinue learning *before* gaining the understanding of IT required to make sound strategic IT decisions.

Managerial Characteristic	Nerd Characteristic
Smooth Communication Ability	Alienating Use of Jargon
Adventurous	Un-athletic
Tactful, Aware of Others' Feelings	Focused on Technology and Oblivious to Feelings

Table 1: Contrasting the Characteristics of Managers and Nerds (Penley et al. 1991; Schein 1973; Guzman and Stanton 2009)

Research Model

Based on the theoretical perspectives above, we constructed a model designed to address the research questions: *does the nerd effect exist and what effect does the nerd effect have on managers when they communicate with IT workers?*

Research Hypotheses

To address our research questions regarding the existence and effect of our proposed nerd effect, we have designed a study based on the process of communication described by Dennis, et al.'s (1998) communication synchronicity theory. The communication process typically follows a stage of conveyance (where content is conveyed in one-way, often written, communication) followed by convergence (where there is social interaction between the parties to arrive at a shared model). Our model is based on the proposition that managerially-oriented individuals will invest effort in the less social stage of conveyance while engaging less in the more social stage of convergence with individuals they believe to be nerds. The

hypotheses below are all based on communication between managerially-oriented individuals and a "presenter," who may or may not be perceived as a nerd.

Our first hypothesis addresses the manager's effort to process conveyed information before having the opportunity to resolve ambiguities in that information through synchronous communication. During the initial stage of a business-IT strategic communication, information is generally conveyed in an asynchronous manner (i.e., the expert sends or conveys information to the manager who has the opportunity to process it). This conveyance allows the manager to form a mental model, which may contain ambiguities.

While the nerd effect is generally inhibitive, managers may be motivated to process IT-related information conveyed to them by a nerd. This is because the nerd is endowed with expert power, stemming from the authority they are believed to have regarding all things related to technology. Because of the nerd's authority, a manager may invest more effort processing information received asynchronously from a nerd. Thus:

H1a: *Perceived Presenter Nerdiness will be positively associated with Conveyance.*

Our next two hypotheses, H1b and H1c, address the manager's discomfort during synchronous (interactive and social) communication regarding IT with nerds. First, the very act of engaging in a rich IT-related conversation with a nerd may be uncomfortable for the manager. Social interaction with a nerd, especially in an IT-related context, may fail an image compatibility check. The image of someone deeply engaged with the nerd in an IT-related discussion may be incompatible with the ideal managerial self-image, causing him or her to avoid this activity.

H1b: *Perceived Presenter Nerdiness will be negatively associated with Convergence.*

Managers may not be comfortable thinking of themselves as being able to control an IT-related conversation. Normally, control and mastery over a social interaction, such as a conversation, would be associated with managers and not with IT staff. However, the control over an *IT-related* conversation may be incompatible with managers' ideal self-image because it would be indicative of an intense interest in IT. An intense interest in IT is closely associated with the nerd stereotype and the nerd stereotype is incompatible with the managerial image. Thus, taking the initiative and controlling an IT-related conversation may be incompatible with the manager's desired self-image, and this would cause the manager to avoid controlling the communication. Compounding this would be the IT expertise associated with nerds. The more that managers perceive their presenter to be a nerd, the more they would be willing to surrender control of the conversation to the presenter. Thus:

H1c: *Perceived Presenter Nerdiness will be negatively associated with (Managerial) Communication Control*

H2a and H2b are directly derived from the propositions of media synchronicity theory, upon which our method is based. According to the theory, both the conveyance of information and the convergence on information contribute to perceptions of a successful outcome of communication. Thus,

H2a: *Conveyance will be positively associated with communication success.*

H2b: *Convergence will be positively associated with communication success.*

H2c challenges the generally accepted relationship between Communication Control and Communication Success. Prior research has found that individuals associate the success of communication with their control over that communication (Canary and Spitzburg 1987; Rubin and Martin 1994). This makes intuitive sense; the individual who controls the communication can drive that communication until they have successfully gained the level of knowledge they require (Von Glasersfeld 1989). However, this may not hold for communication between managers and nerds. Controlling a successful conversation about IT may be incompatible with the manager's self-image because of the association of IT expertise with non-managerial characteristics (see Table 1, above). By contrast, the association of nerds with IT expertise may allow the manager to surrender control of communication to an individual whom they perceive as a nerd. Therefore, the more the manager believes that the conversation was controlled by the nerd, and not controlled by his or her self, the more they will believe that the conversation was successful. Thus:

H2c: *Managers' Communication Control will be negatively associated with Communication Success.*

Research Method

To find evidence of the nerd effect, we performed a quasi-experiment under laboratory conditions. Laboratory conditions facilitate a focus on specific psychological causal effects (Davis and Rose 2000). The nerd effect is a novel phenomenon, and our goal is to see if its causal relationships with communication exist; this was the primary reason we elected to carry out our study under laboratory conditions. Another consideration is that the process of communication may not suited to testing by survey; rather, they require testing by direct observation of subjects as they complete interactive tasks (Dennis et al. 1998).

Experimental Design

Six groups of eight to ten subjects were each introduced to a "computer programmer" and given the experimental task of working, as a group, to agree on an optimal mix of technologies to be studied together in a hypothetical MBA technical business course. They were told that the computer programmer would describe a set of seven computer languages and that a business course could cover two to four of the seven languages. Because this part of the exercise was designed to represent the conveyance of information in a non-interactive mode, subjects were told to not ask questions. The subjects were also told that after this initial briefing, they would be asked to write down logical combinations of technologies to study for a course, if they could think of any. The subjects were also informed that they would then have the opportunity to participate in an open conversation with the computer programmer to arrive at a better combination of technologies and form a consensus. Then, the exercise began as the computer programmer[1] conveyed basic information about HTML, C#, Python, Django, ASP.NET, SQL Server, and MySQL. As the technologies were explained, they were listed on a whiteboard to help subjects remember the name of each. Then to test Conveyance, each subject was given time to think through the information and list technology combinations that made sense to them.

The open conversation portion of the exercise was designed to measure Convergence. During the open conversation, the computer programmer answered questions for each group separately by communicating information from prepared scripts. These scripts contained business-IT information which could be used to combine the technologies in a meaningful way. For example, scripted answers would reveal that knowledge of ASP.NET is helpful in conjunction with C# and SQL Server, and that these three technologies are used together by numerous large firm. So, as each group asked questions and received answers, they had the opportunity to uncover enough knowledge to suggest learning these three technologies together. In this way, groups would be able to arrive at one of several acceptable combinations of technologies. All groups of subjects questioned the presenter until arriving upon one of three ideal combinations of technologies based on the information revealed by the scripted answers. During this portion of the exercise, the individuals remained in their groups and were asked to work together, with their presenter, to arrive at an optimal mix of technologies. Thus, the activity occurred at a group level.

Before adjourning, each individual subject completed a survey instrument. The survey instrument was used for every measure in our model except that of conveyance. Following in the tradition of Dennis, et al. (2008), we used the size of the lists of subjects' initial combinations (written down before they could ask questions) as a measure of conveyance. A figure displaying the steps in this experimental protocol can be found below, in Figure 3.

[1] This presenter was carefully selected on the basis of "ambiguous nerdiness." The presenter was a computer programmer with a background in CS and working on a degree in Business Administration. During pilot tests, subjects varied in how much they perceived the presenter to be nerdy. This variance is what allowed us to test the effects of different levels of perceived nerdiness.

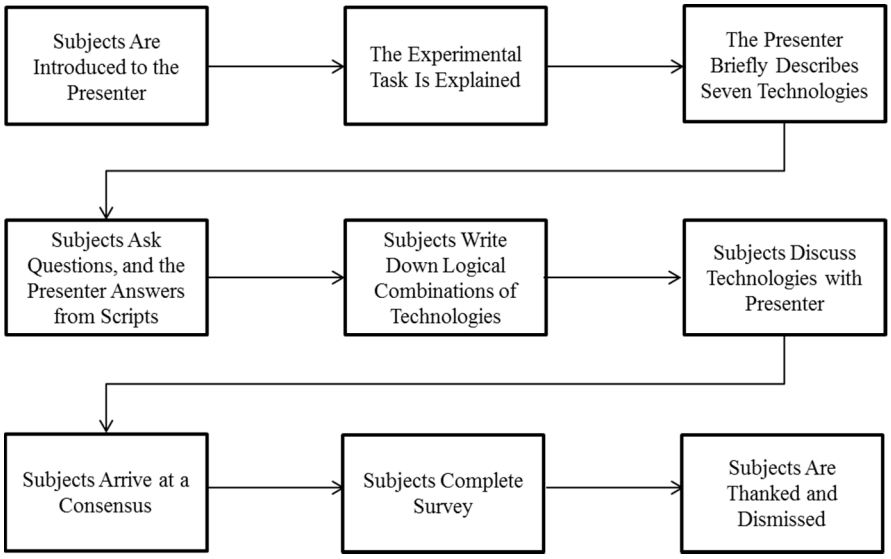

Figure 3: Quasi-Experiment

Our experimental task was designed to be generalizable to the communication of novel IT information in the business context. The decision to group technologies together for an MBA course must be informed in a similar manner to a strategic IT decision in the managerial realm. We map the common characteristics of MBA activity and the strategic IT decision in practice in Table 2, below.

Characteristics of the Strategic IT Decision	MBA Student Experiment Similarity
Strategic IT decisions focus on the objectives of the organization.	The selection of technologies focuses on the career objectives of the MBA student.
The person who makes the strategic decision, and is responsible for its consequences, is the manager.	The person who makes the strategic decision, and is responsible for its consequences, is the MBA student.
The strategic decision involves both the manager and subject matter experts; in this case, the subject matter is IT, and the subject matter experts are IS personnel.	The strategic decision involves both the MBA student and a subject matter expert; in this case, IT is integral to the subject matter, and the subject matter expert is the computer scientist.
The strategic IT decision depends on the manager communicating with IS personnel, with the manager providing context information to the IS personnel, and with the Manager as the recipient of contextualized IT knowledge that can be used to make a decision.	The subjects' decisions depend on the MBA student communicating with the computer programmer, with the student soliciting contextualized IT knowledge used to make a decision. As in practice, this communication depends on both conveyance and convergence.
The strategic IT decision is made by a small number of high-level people in a non-repetitive (novel) way. As a result, they benefit less from prior experience.	Our experiment presents a novel decision to the MBA student, who is working in a small group. Novel information requires both conveyance and convergence.
The strategic IT decision is supported by a broad level of often aggregated information. Accuracy is not as important as broad understanding.	The knowledge that the MBA students will need for the convergence exercise is broad in nature.

Table 2: Mapping the Experiment to the Strategic IT Decision

Pilot Tests

The experiment was refined over the course of five pilot tests, using undergraduate students as subjects. During these pilot tests, new scripted answers were written as subjects asked unanticipated questions. After each pilot test, subjects were interviewed to determine how to improve the experiment. Based on these interviews, the number of technologies used in the experiment was reduced from 11 to 7 to avoid overwhelming subjects. At the conclusion of pilot testing, the scripts were finalized and no further changes were made to the experiment.

Sample

Our population of interest is composed of managers. Accordingly, we selected working MBA students for our sample frame, based on the assumption that these students have managerial ambitions and would thus be susceptible to the nerd effect's social influence. To determine our sample size, we used the multiple linear regression power analyses tool in the software package, G*Power 3.1 (Faul et al. 2009). Based on pilot tests, which demonstrated a large effect size, we applied the following settings: anticipated $f = 0.35$, desired $p < 0.05$, and a power level of 0.8. Thus we arrived at a minimum sample size of 55. Our final sample consisted of 58 MBA students. After being screened for outliers and incomplete responses, our useable data consisted of 57 cases (35 men, 22 women; average age of 30, minimum age of 22, maximum age of 54).

Measurement Constructs and Measures

Construct	Definition	Constitutional Definition	Operationalization	Reference
Perceived Nerdiness of the Presenter	The degree to which an individual perceives another to conform to the nerd stereotype.	The degree to which a manager believes that the IT staff giving them information is a nerd.	Subjects rate their agreement with statements about the presenter being a nerd.	Guzman and Stanton 2009
Conveyance	The degree to which an individual is able to construct a mental model from a 1 way communication of novel information.	The degree to which a manager understands information presented in a 1-way communication.	Measured by a count of technology combinations generated by subjects using only conveyed information.	Dennis et al. 2008
Convergence	Resolution of information ambiguity by using question and answer sessions to arrive at shared knowledge.	The degree to which a manager engages with the others to reduce equivocality in the conveyed message.	Subjects rate their agreement with statements about their level of understanding of the group solution.	Dennis et al. 2008
Communication Control	Controlling the duration and content of a conversation.	The degree to which a manager believes that they take a leadership role in a business-IT discussion.	Subjects rate their agreement with statements about control of the communication activity.	Dennis et al. 2008; Canary and Spitzberg 1987

Communication Success	The extent to which the communication furthered the goals of the individual.	The degree to which a manager believes that they received sufficient information from the communication activity.	Subjects rate their agreement with statements about the success of the communication activity.	Dennis et al. 2008; Canary and Spitzberg 1987

Table 3: Model Constructs

Analysis

Our method of analysis was ordinary least squares regression. The ordinary least squares approach is consistent with prior tests involving communication (e.g., Dennis et al. 2008), and regression analysis affords the use of control variables and produces slope data, which is of interest in this study.

Beginning with 58 data points, we tested for the presence of outliers. Based on standardized and standardized residuals, as well as Mahalanobis' distance, a single case was identified as a potential outlier and eliminated from the sample (Cohen et al. 2003). The remaining 57 cases were tested for normality. By examining a q-q plot comparing our distribution of results against that of a perfectly normal sample, we found sufficient support for the assumption of normality.

Our sample consisted of 35 men and 22 women. Their average age was 30, with a minimum age of 22 and a maximum age of 54. During analysis, we included gender and prior knowledge of our set of technologies in the model as control variables. Gender was selected as a control because gender has been associated with the nerd stereotype (Kendall 2000) and must be considered as a potential cause of some variance in the model. Likewise, technical knowledge was included due to its potential to confound our independent variables. The results of our analysis are presented below, in Figure 4 and Table 4.

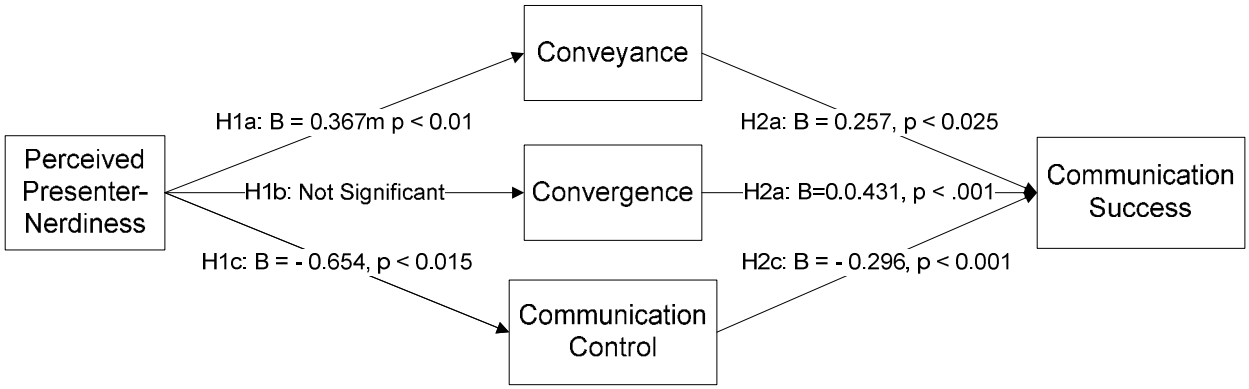

Figure 4: Model with Results

Hypothesis	R2	Beta	Sig
H1a: Perceived Presenter-Nerdiness --> Conveyance	0.132	0.367	p < 0.01
H1b: Perceived Presenter-Nerdiness --> Convergence (-)			ns
H1c: Perceived Presenter-Nerdiness --> Communication Control	0.146	-0.654	p < 0.015
H2a: Conveyance --> Communication Success	0.145	0.257	p < 0.025
H2b: Convergence --> Communication Success	0.235	0.431	p < 0.001
H2c: Communication Control --> Communication Success (-)	0.235	-0.296	p < 0.001

Table 4: Hypothesis Tests

Discussion

The results indicated support for all the hypotheses in the study, surprisingly with the exception of H1b (the impact of perceived nerdiness on convergence). We cannot readily explain the lack of support for H1b. It is possible that for convergence, the managers did not sufficiently engage with the nerd so that the measurement (common understanding of the group solution) lacked validity. Also, giving up control of communication in the interactive session might have reduced the onus on managers to work on a solution. From the pilot tests, we did not see indication of these issues, so the explanations provided are somewhat speculative.

However, the results of this quasi-experiment did indicate that *the nerd stereotype does affect how managers communicate with IT staff and inform strategic business-IT decisions*. When a manager believes that they are communicating with a "nerd," the imagery associated with nerds impacts the manager's behavior in at least two ways: first, the manager is likely to invest heavily in the process of receiving conveyed information from the nerd. This may be in recognition of the IT expertise associated with the nerd stereotype (Guzman and Stanton 2009). Second, managers tend to abdicate control over a business-IT communication activity to those whom they perceive to be nerds. Again, this may be in recognition of the IT expertise associated with the nerd stereotype. However, this may also be to alleviate the discomfort felt by managers while discussing IT.

In addition, our findings indicate that the normally positive relationship between managers' communication control and their perception of communication success is inverted into a negative relationship, when the topic is IT. Managers seem willing to abdicate control to the nerd and still perceive the communication as successful. Taken together, these findings form our work's contributions to theory and to practice, as explained below.

Implications for Theory

Considering the prominence of business-IT alignment in IS research, along with the fact that such alignment tactically depends upon communication between managers and technical staff, the findings of this paper should be of interest to researchers. Similarity of background between top managers and CIO's is a known antecedent of business-IT alignment, as is effective communication (Preston and Karahanna 2009). This work improves upon our understanding by uncovering social and psychological factors integrating background and communication. The nerd effect also shines a light deeper into the relationships between background, communication, and business-IT alignment. The nerd stereotype demonstrates that differences in the background have a powerful effect on the communication upon which business-IT alignment depends. While the nerd effect is one way of characterizing the differences across IT and business groups that could inhibit communication, it offers a new construct and mechanism to explore the communication aspects of alignment.

In addition, the nerd effect has broader theoretical implications than prior work on business-IT alignment in that it is not limited to the context of top management and CIO interactions. Much prior research has examined business-IT alignment only at the highest levels in the organization, and only regarding major strategic initiatives (Karahanna and Preston 2013; Johnson and Lederer 2005; Preston and Karahanna 2009). At the top level of management, the findings of prior research may be well tested. However, business-IT communication takes place at all levels of management, and across a wide variety of contexts (Swanson 1994). As IT becomes more ubiquitous and strategic IT decisions become more distributed in the organization, IS theory will need to address social interactions that occur at all levels of the organization. As the first work of its kind, this paper presents an opportunity for future researchers to explore the complex interactions of background and the communication that take place at and across all levels in the organization.

Finally, this work's finding regarding communication control can be useful for research in the field of communication. By theoretically explaining and empirically demonstrating a context under which the traditional relationship between communication control and communication success is inverted, this work justifies further questioning of the current understanding of the nature of successful communication.

Implications for Practice

Despite a strong tradition in IS research devoted to the business-IT alignment issue, it remains a problem in industry (Chan 2002). This paper presents evidence for the effect of a manger's perspective of IT staff on the communication upon which business-IT alignment relies. This perception might facilitate the transfer of information but in doing so, the manager may abdicate control over the information. The fact that managers see this communication as successful might indicate the presence of a significant problem. Perhaps there is premature acceptance of technical information without full absorption of the deeper relationships and models involved. So, managers may not be basing decisions on fully assimilating material conveyed by technical staff, but "feel" that they do understand it based on high conveyance and low control. This, if occurring at various levels of the organization for strategic decisions and their offshoots, may inhibit business-IT alignment.

It is important to note that, as the first study of its kind, this work is bounded in its goal. We have demonstrated that the nerd effect exists. The key elements of the nerd effect are 1) managers allow nerds to control business-IT communication, and 2) managers associate a lack of control over business-IT communication with success. That association may result in premature perceptions of complete and successful communication. Consider managers who perceive IT staff as very nerdy, and thus may be subject to the nerd effect. They may allow the IT staff to control business-IT communication by asking for analogies that they can easily understand, rather than driving the communication until they have a true shared mental model. Managers who do not perceive their IT staff as nerdy, by contrast, are more likely to associate the success of business-IT communication with their own control over it. Thus, they may be more likely to avoid satisficing with simple analogies and drive the communication process until they are better prepared to make a business-IT decision.

The relationship between perceived communication success and the actual sufficiency of information learned by the manager is subject to further experimentation. However, a reasonable conclusion that the nerd effect can be harmful can be made, based on existing research on strategic IT decisions, the nature of the information managers need, and the process of communication. Thus, managers may be advised to recognize the power of the nerd stereotype to affect their behavior. To mitigate the nerd effect, managers should deliberately avoid satisficing when engaged in IT communication, and rigorously engage with IT staff until they are certain that they have arrived at a shared mental model. This may require the manager to control the business-IT communication process, even at the expense of some psychological discomfort.

Finding	Takeaway
Perceived Presenter-Nerdiness positively relates with Conveyance.	**Theory**: Differences in background across technical and non-technical groups can be captured through factors like the "nerd effect." The effectiveness of communication can be explained through mechanisms consistent with psychological theories in the communication literature.
	Practice: Managers may consider their mental models formed from conveyed information through technical staff as adequate. However, they should refine these by conduction sessions with technical staff richer (interactive) media.
Perceived Presenter-Nerdiness negatively relates to Communication Control.	**Theory**: The nerd effect has a causal pathway through abdication of managerial control and communication success. Future research may provide a deeper understanding of the process of communication across the managerial/technical divide – and contribute to the fundamental understanding of business-IT alignment.
	Practice: Managers are advised that they may be ceding control over business-IT communication and that, by doing so, they may be giving decision power to IT staff.
Conveyance and Convergence positively relate to Communication Success.	**Theory**: This finding supports the proposition that both Conveyance and Convergence Contribute to Successful Communication.

	Practice: Managers are advised that effort invested in both Conveyance and Convergence leads to Communication Success.
Communication Control negatively relates to Communication Success.	**Theory**: This finding challenges traditional theory associating Communication Control with Communication Success.
	Practice: Managers are advised to pursue the communication effort beyond the point of discomfort and until they are completely certain that a shared mental model has been achieved.

Table 5: Key Study Takeaways

Limitations

The statistical support for our hypotheses was established under laboratory conditions. While such conditions allow for a great deal of power by isolating research from extraneous sources of variation, they may lack the external validity of field observations (Mienaltowski 2011). While not ideal, we tried to carefully establish ecological validity by aligning the experimental decision and the characteristics of real-world strategic business-IT decisions (summarized in Table 2, above). Nevertheless, it must be noted that our subjects were performing a hypothetical task, without the real-world risks associated with real-world managerial deliberation. We would argue that the finding of a "nerd effect" itself is a useful contribution of the study. In addition, our results are aligned with those of field studies in the field of education, which have demonstrated that most individuals avoid behavior that they consider to be nerdy (Myers and Beise 2001).

Conclusion

This research addresses the critical issue of business-IT alignment from the perspective of a manager and his or her strategic IT decision-making. To do this, we have broadened IS research to address well-known perceptions of IT workers and how those perceptions affect behavior. While the broader academic world has long acknowledged the association the nerds with IT expertise and with perceptions of anti-social behavior, this article reveals how those associations can affect communication between managers and nerds. Specifically, we have demonstrated how those associations can cause managers to disengage from the communication that is vital to business-IT strategic decisions. This work may stand as the starting point for future research that would study the effects of how managers view IT staff, and vice-versa, and how those effects may prevent business-IT alignment and limit the quality of strategic IT decision making.

References

Ackoff, R. L. 1967. "Management misinformation systems," *Management Science*, (14:4), B-147.

Alexiev, A. S., Jansen, J. J., Van den Bosch, F. A., and Volberda, H. W. 2010. "Top management team advice seeking and exploratory innovation: the moderating role of TMT heterogeneity," *Journal of Management Studies*, (47:7), pp. 1343-1364.

Anthony, R. N. 1965. *Planning and control systems: A framework for analysis*. Harvard University, Boston.

Bhattacherjee, A. 2001. "Understanding information systems continuance: An expectation-confirmation model," *MIS Quarterly*, (25:3), pp. 351-370.

Beach, L. R., and T. R. Mitchell. 1987. Image theory: Principles, goals, and plans in decision making. *Acta Psychologica,* (66:3), pp. 201-220.

Bishop, D. V. M., and McArthur, G.M. 2004. "Immature cortical responses to auditory stimuli in specific language impairment: Evidence from ERPs to rapid tone sequences," *Development Science,* (7:4), pp. 11-18.

Canary, D. J., and Spitzberg, B. H. 1987. "Appropriateness and effectiveness perceptions of conflict strategies," *Human Communication Research*, (14:1), pp. 93-120.

Carlson, J. R., and J. F. George. 2004. "Media appropriateness in the conduct and discovery of deceptive communication: The relative influence on reichness and synchronicity," *Group Decision and Negotiation, (*13:2), pp. 191-210.
Chan, Y. E. 2002. "Why haven't we mastered alignment? The importance of the informal organization structure," *MIS Quarterly Executive*, (1:2), pp. 97-112.
Chan, Y. E., and Reich, B. H. 2007. "IT alignment: what have we learned?," *Journal of Information technology*, (22:4), pp. 297-315.
Chen, D. Q., Mocker, M., Preston, D. S., and Teubner, A. 2010. "Information systems strategy: Reconceptualization, measurement, and implications," *MIS quarterly*, (34:2), pp. 233-259.
Cohen, J., Cohen, P., West, S. G., and AIken, L. S. 2003. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
Coughlan, J., Lycett, M., and Macredie, R. D. 2005. "Understanding the business–IT relationship," *International Journal of Information Management*, (*25*:4), pp. 303-319.
Dulipovici, A. and Robey, D. 2013. Strategic alignment and misalignment of knowledge management systems: A social representation perspective. *Journal of Management Information Systems*, (29:4), pp.103-126.
Davenport, T. H., S. J. 1990. "The new industrial engineering: Information technoiogy and business redesign," *Sloan Management Review*.
Davenport, T. H., and Short, J. E. 2003. "Information technology and business process redesign," *Operations Management: Critical Perspectives on Business and Management*, (*1)*, 1-27.
Davis, A., and Rose, D. 2000. "The experimental method in psychology," *Research Methods in Psychology*, (*2)*, pp. 42-58.
DeLuca, D., and Valacich, J. 2005. "Outcomes from conduct of virtual teams at two sites: Support for media synchronicity theory," *Proceedings of the 38th Annual Hawaii International Conference on System Sciences*.
Dennis, A., Fuller, R., and Valacich, J. 2008. "Media, tasks, and communication processes: A theory of media synchronicity," *MIS Quarterly, (32:*3), pp. 575-600.
Dennis, A., and Wixom, B. 2001. "Investigating the moderators of the group support systems use withmeta-analysis," *Journal of Management Information Systems, (18:*3).
Dennis, A., Valacich, J., Speier, C., and Morris, M. 1998. "Beyond media richness: An empirical test of media synchronicity," *Thirty-First Annual Hawaii International Conference on Systems Sciences*.
Eisenberg, A. M. 1978. *Understanding* communication *in business and the professions*. Macmillan Publishing Company.
Eisenhardt, K. M. 1997. "Strategic decisions and all that jazz," *Business Strategy Review*, (8), pp. 1–3.
Elbanna, S., and Child, J. 2007. "The Influence of Decision, Environmental and Firm Characteristics on the Rationality of Strategic Decision-Making," *Journal of Management Studies*, (44:4), pp. 561-591.
Faul, F., Erdfelder, E., Buchner, A., and Lang, A. G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, (*41*:4), pp. 1149-1160.
Fagnot, I., Guzman, I. R., and Stanton, J. M. (2007). Toward recruitment and retention strategies based on the early exposure to the IT occupational culture. *America Conference on Information Systems 2007 Proceedings*.
Gorry, G. A., and Morton, M. S. 1970. *A Framework for Management Information Systems*. Massachusetts Institute of Technology.
Green, R. J., and Ashmore, R. D. 1998. Taking and developing pictures in the head: Assessing the physical stereotypes ofeight gender types1. *Journal of Applied Social Psychology*, (*28*:17), pp. 1609-1636.
Gulz, A., Haake, M., and Tärning, B. 2007. "Visual gender and its motivational and cognitive effects–a user study," *Lund University Cognitive Studies*, p. *137*.
Guzman, I. R., and J. M. Stanton. 2009. "IT occupational culture: The cultural fit and commitment of new information technologists," *Information Technology and People,* (22:2), pp. 157-187.
Henderson, J. C., and Venkatraman, N. 1993. "Strategic alignment: Leveraging information technology for transforming organizations:, *IBM Systems Journal*, (32:1), pp.472-484.

Huang, H. M. 2002. "Toward constructivism for adult learners in online learning environments," *British Journal of Educational Technology*, (33:1), pp. 27-37.
Jansen, J. J. P., George, G., Van den Bosch, F. A. J., and Volberda, H. W. 2008. "Senior team attributes and organizational ambidexterity: the moderating role of transformational leadership," *Journal of Management Studies*, (*45*), pp. 982–1007.
Johnson, A. M., and Lederer, A. L. 2005. "The effect of communication frequency and channel richness on the convergence between chief executive and chief information officers," *Journal of Management Information Systems*, (22:2), pp. 227-252.
Kahal, S., and Cooper, R. 2003. "Exploring the core concepts of media richness theory: The impact of cue multiplicity and feedback immediacy on decision quality," *Journal of Management Information Systems,* (20:1), pp. 263-299.
Kahal, S., Carroll, E., and Jestice, R. 2007. "Team collaboration in virtual worlds," *Newsletter: ACM SIGMIS Database,* (38:4).
Kappelman, L., McLean, E., Luftman, J., and Johnson, V. 2013. "Key issues of IT organizations and their leadership: The 2013 SIM IT trends study," *MIS Quarterly Executive*, (12:4), pp. 227-240.
Karahanna, E., and Preston, D. S. 2013. "The Effect of Social Capital of the Relationship Between the CIO and Top Management Team on Firm Performance," *Journal of Management Information Systems*, (30:1), pp. 15-56.
Kearns, G. S., and Sabherwal, R. 2007. "Strategic alignment between business and information technology: a knowledge-based view of behaviors, outcome, and consequences," *Journal of Management Information Systems*, (23:3), pp. 129-162.
Kendall, L. 2000. "Oh no! I'm a nerd!" Hegemonic masculinity on an online forum. *Gender and Society*, (14:2), pp. 256-274.
Kilov, H. and Sack, I. 2009. "Mechanisms for communication between business and IT experts," *Computer Standards and Interfaces,* (31), pp. 98-109.
King, W. R. 1978. "Strategic planning for management information systems," *MIS Quarterly*, pp. 27-37.
Leidner, D. E., and Kayworth, T. 2006. "Review: a review of culture in information systems research: Toward a theory of information technology culture conflict," *MIS quarterly*, (30:2), pp. 357-399.
Luftman, J., and Ben-Zvi, T. 2010. "Key issues for IT executives 2009: Difficult economy's impact on IT," *MIS Quarterly Executive*, (9:1), pp. 203-213.
Ma, M., and Agarwal, R. 2007. "Through a glass darkly: Information technology design, identity verification, and knowledge contribution in online communities," *Information Systems Research*, (18:1), pp. 42-67.
Melone, N. P. 1990. "A theoretical assessment of the user-satisfaction construct in information systems research," *Management science*, (36:1), pp. 76-91.
Mienaltowski, A. 2011. Everyday problem solving across the adult life span: solution diversity and efficacy," *Annals Of The New York Academy Of Sciences,* (1235), pp. 75-85.
Murthy, U., and Derr, D. 2003. Decision making performance of interacting groups: An experimental investigation of the effects of task type and communication mode," *Information and Management,* (40:5), pp. 351-360.
Myers, M. E., and C. M. Beise. 2001. "Nerd work: Attractors and barriers perceived by students entering the IT field," *Proceeding of the 2001 ACM SIGCPR*.
Penley, L. E., Alexander, E. R., Jernigan, I. E., and Henwood, C. I. 1991. "Communication abilities of managers: The relationship to performance," *Journal of Management*, (17:1), pp. 57-76.
Preston, D. S., and Karahanna, E. 2009. "Antecedents of IS strategic alignment: A nomological network," *Information Systems Research,* (20:2), pp. 159.
Rubin, R. B., and Martin, M. M. 1994. Development of a measure of interpersonal communication competence," *Communication Research Reports*, (11:1), pp. 33-44.
Sabherwal, R. and King, W. R. 1995. "An empirical taxonomy of the decision-making processes concerning strategic applications of information systems," *Journal of Management Information Systems,* (11:4), pp. 177-204.
Schein, V. 1973. "The relationship between sex role stereotypes and requisite management characteristics," *Journal of Applied Psychology*. (57:2), pp. 95-100.
Shuraida, S. and Barki, H. 2013. "The influence of analyst communication in IS projects," *Journal of the Association for Information Systems*, (14:9), p. 2.

Snyman, J. H., and Drew, D. V. 2003. "Complex strategic decision processes and firm performance in a hypercompetitive industry," *The Journal of American Academy of Business*, (2), pp. 293–8.
Soper, T. 2013. Study: Women avoid computer science careers because they think 'nerds' are smelly and pale. Retrieved from http://www.geekwire.com/2013/study-women-choose-computer-science-careers-nerd-stereotypes/, accessed 5 May, 2016.
Stibel, A. 2012. "3 Ways to Bridge the Communication Gap Within Your Tech Company," http://mashable.com/2012/02/16/tech-company-culture/, accessed 27 October, 2014.
Swanson, E. B. 1994. "Information Systems Innovation among Organizations," *Management Science*, (40:9), pp. 1069-1092.
Sprague, R. S. 1980. "A framework for the development of decisoin support systems," *MIS Quarterly,* (4:4), pp. 1-26.
Tabachnick, B. G., and Fidell, L. S. 1996. *Using Multivariate Statistics (Third ed.)*. New York: HarperCollins.
Venkatesh, V., and Davis, F. D. 2000. "A theoretical extension of the technology acceptance model: Four longitudinal field studies," *Management science*, (46:2), pp. 186-204.
Von Glasersfeld, E. 1989. "Cognition, construction of knowledge, and teaching," *Synthese*, (80:1), pp. 121-140.
Zhang, Q. 2010. "Perceptions of Asian American students: Stereotypes and effects," Retrieved from http://www.natcom.org/CommCurrentsArticle.aspx?id=963, retrieved on May 5, 2016.