No Meeting of the Minds?
Exploring CIO and Analyst Strategic Mental Models

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Strategic IT alignment is seen in "an overwhelming body of literature" (Sabherwal, Sabherwal, Havakhor, & Steelman, 2019, p. 454) as the state of congruence between an organization's IT strategy and the organizations business strategies. Strategy is the plan for getting from where you or your organization is to where it wants to be (Webb, 2019). Generally, organization management has the task of coming up with the strategy and the workers have the task of implementing that strategy. These two groups should agree on the current situation, what the strategy is, how to implement it, and the ultimate goals. When the two groups do not agree, implementing the strategy is difficult at best and impossible at worst. This paper explores how the mental models (Johnson-Laird, 2010) an organization's strategy of IT personnel transition in the minds of management (Chief Information Officers) and workers (analysts). Revealed causal mapping brings these mental models to light so they can be compared, and where the mental models differ, action can be taken so management and workers are all on the same page.

Keywords: alignment, strategy, mental models, revealed causal mapping

INTRODUCTION

Alignment! Strategic Alignment! Strategic IT Alignment! Everything just seems to work better when everyone is all aligned and working towards the same goal. But why and how this works continues to be an active research topic as propounded by Gerow, Grover, Thacher, and Roth (2014). The alignment between an organization's information technology (IT) strategy and its organizational strategy continues to be seen as a critical IT management issue since the topic was introduced over forty years ago (Henderson & Venkatraman, 1992; King, 1978). Most studies find benefits and positive returns in aligning IT and organizational strategy and this continues to be an active research topic to try to determine how and why strategic IT alignment provides benefits to organizations, and under what conditions to clear up some inconsistent results.

However, most research seems aimed at examining the strategic alignment between IT and the organization. That is, the alignment between the strategic goals of the CEO and the CIO. Relatively little research has been directed at the strategic alignment farther down the chain. Whatever the strategic alignment is between the CEO and the CIO, the CIO cannot execute that strategy effectively unless there is also a strategic alignment between the CIO and the IT organization.

In this paper, we explore the strategic alignment between the CIO and the analysts in the IT organization. We do this by examining the mental models of IT executives (here collectively called "CIOs") and the analysts in the IT organization. It's difficult to explore the full strategic spectrum in a single manuscript, so we focus on just one small facet: the CIOs' strategy of transitioning the IT organization from ad hoc processes into a software engineering discipline. The CIOs have one idea of how it should go, while the analysts may have something quite different in mind.

This is an exploratory study, a demonstration experiment, that examines and compares the mental models of CIOs and analysts. We used revealed causal mapping to see their deep understanding of the IT personnel landscape. For the transition to be efficient and effective, the deep understanding of "how things work around here" should align between the CIOs and the analysts. The results indicate that the CIOs and the analysts have very different mental models of their same IT personnel landscape.

We begin with a literature review of strategic alignment between IT and the organization, then review the literature of the strategic alignment between management and workers. We then describe the study, the results, and end with a discussion of the implications of the research.

Alignment: Organization – IT - Employee

Strategic IT alignment is seen in "an overwhelming body of literature" (Sabherwal, Sabherwal, Havakhor, & Steelman, 2019, p. 454) as the state of congruence between an organization's IT strategy and the organizations business strategies. This congruence is achieved through mutual trust (Reich & Benbasat, 2000) and shared knowledge (Nelson & Cooprider, 1996) between IT executives and the organization's business executives. Times of environmental uncertainty enhance the effect of strategic IT alignment on an organization's performance (Sabherwal et al., 2019) with both sides working together to leverage the organization's IT investment.

Henderson and Venkatraman (1992, 1993) introduced the Strategic Alignment Model (SAM) that defines IT / business alignment by its externalities and across four components: business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes. IT / business alignment is the fit between two or more of these components. It focuses on externalities such as (in business strategy) business scope, distinctive competencies, and business governance; (in IT strategy) technology scope, systemic competencies, and IT governance; (in organizational infrastructure and processes) administrative infrastructure, processes, and skills; (and in IT infrastructure and processes) architectures, processes, and skills. For example, strategic alignment (Reich & Benbasat, 1996, 2000), called "intellectual alignment" in Henderson and Venkatraman is defined as "the degree to which the mission, objectives, and plans contained in the business strategy are shared and supported by the IS strategy" (Chan, Sabherwal, & Thacher, 2006, p. 27).

IT / Business alignment research has generally been constrained to fit within the Strategic Alignment Model. In their meta-analysis of 30 years of strategic alignment research, Gerow, Grover, Thacher, and Roth (2014) found that of the 79 research articles examined, all but 8 used at least one of the Strategic Alignment Model's dimensions. Measures of strategic alignment were either survey items or interview questions that were "designed to collect information on the IT and business strategy of the firm so alignment can be determined through moderation, mediation, matching, covariation, profile deviation, or gestalt approaches" (Gerow et al., 2014, p. 1163). While the model and the methods work well when exploring the consequences of alignment or non-alignment within an organization, they do not allow exploration "outside the box" not do they dig deeply into what the organization (through the CEO) or the IT organization (through the CIO) truly believe about the strategic direction of their respective domains.

It can be assumed that the CEO knows (whether implicitly or explicitly) the strategic direction of the organization. It is the CEO's duty to determine the organization's goals, to develop the strategy for reaching those goals, and for communicating that strategy down through the organization from upper management to middle management to lower management and eventually to the employees for implementation. The visionaries in the organization must be strategically aligned with each other to build strategic consensus. That is, aligned with the strategic context of their organization (Govindarajan, 1989). If lower-level organizational leadership has goals and strategies that are not aligned with upper management, the result is

an ineffective organization moving in a direction that is not aligned with the CEO's vision. "Such misaligned visionary leadership is likely to invite resistance to top management's strategic vision and may give rise to initiatives that are not in line with the strategy, slowing down or even sabotaging strategy implementation" (Ates, Tarakci, Porck, von Kippenberg, & Groenen, 2018, p. 644). This is the core of IT / organizational strategic alignment.

Even when organizational leadership from the CEO to the CIO to IT department management is all in alignment with a common vision and a common strategy, that alignment is necessary but not sufficient for success. The strategy must be put into action to achieve results. Strategy formulation and strategy implementation need alignment throughout the organization. "Strategy is a two-way street requiring both visionary leadership and empowered followers" (Hart & Banbury, 1994, p. 253; Westley & Mintzberg, 1989). Top, middle, and lower-level managers are responsible for communicating and clarifying the organization's strategy to the workers (Ates et al., 2018). The CEO, CIO, middle management, and the workers must all be aligned with a common understanding of the organization's strategy. "This direct alignment between organizational goals and individual goals is the key component to successful implementation of organizational goals and increasing organizational performance" (Ayers, 2013, p. 497).

Poor strategies often fail, but even good strategies need good implementation to succeed (Gagnon, Jansen, & Michael, 2008). Organizational management can create strategy, but it's up to the employees to put that strategy into action. To do that effectively, the employee needs to know, really know, what the organization's goals are and what the strategy must be to achieve those goals. If the employees are pursuing their own goals, especially goals that are at odds with the organizational goals, strategy execution will be poor at best.

Performance Measurement and Management (PMM) systems, when designed and implemented correctly, can assist management in keeping their employees working in the right direction and executing the organizational strategy (Schneier, Shaw, & Beatty, 1991). PMM watches over employees by indicating what to measure, how to measure, and holding employees accountable for performance on those measures. Of course employees must have the core skills (Irvin & Michaels, 1989) and the core competencies (Prahalad & Hamel, 1990) necessary to execute the strategy. This is the physical implementation of the strategy, the external visible manifestation of the strategy. There is an underlying assumption that if the strategy is executed as designed, then there must be strategic alignment between senior management and the employee: between the CEO, the CIO, and the worker. We see the physical strategic alignment, but what is needed is true alignment both mentally and physically.

> "The first challenge in alignment is the understanding of and agreement with vision, values and strategy. Competent, creative and determined people often do not buy into what they have not invented themselves. They have to be convinced of the value of what was invented elsewhere, and that is the first challenge in establishing total alignment" (Khadem, 2008, p. 29).

The importance of employees aligning strategically with management is underscored through many ways of building organizational culture. This is the pattern of shared values and norms that distinguish one organization from another and establishes how things are done in the organization (Higgins & McAllister, 2004). It is the system of shared beliefs and values, introduced through rituals, ceremonies, and stories and that is reinforced by various reward and recognition systems. An organization that has a "strong culture" is one where employees are particularly well-aligned to management goals (Nugent & Flynn, 2020). Although enforced cultural compliance can cause burn-out, anxiety, and alienation (Kunda, 1995). Yet these are all external manifestations of what the employees may or may not believe. Is the employee truly aligned with the organization's strategy or just playing along?

The most common method of examining an employee's understanding of the strategy is through a survey. "Strategic knowledge represents an individual's global understanding of a strategy being pursued by his or her organization; individuals who agree with statements such as 'I understand what strategy X is all about' are demonstrating strategic knowledge as we define it" (Gagnon et al., 2008, p. 426). Yet when

their job is on the line, employees may misrepresent their true beliefs. These lies "are considered to reflect strategic efforts to enhance socially desirable perceptions" (DeAndrea, Tong, Liang, Levine, & Walther, 2012, p. 400). What is needed is a way to determine the employees' deep understanding of the organization's strategy and compare it to management's understanding of that same strategy.

Mental Models

As we go through life, we build up a model of the world in our minds that helps us understand and reason with known situations and interpret unknown situations as they are encountered. These mental models (Craik, 1943; Johnson-Laird, 2006, 2010) are our internal representation of the static and the dynamic outside world. This mental model is learned informally by experience or formally (in business) through manuals and training. Ideally, an organization's strategy is in a set of formal documents that are passed through the organization from CEO to the workers, so everyone has something to refer to as the strategy is implemented. Unfortunately, real world strategy rarely has clear, accurate specifications. Even when the strategy is carefully analyzed, designed, and documented before implementation, the specifications rapidly becomes outdated because they are

> ... based on a flawed premise that is, that workers actually follow layed-down procedures. In fact, for a variety of reasons, people adapt these procedures to local circumstances and resources and this adaptation is dynamic and responsive to change. Circumvention of the rules is the norm rather than the exception and the different kinds of circumvention are so diverse that they cannot readily be articulated (Sommerville & Rodden, 1992, p. 55).

Unfortunately, we have little understanding of mental models behind the perception, the development, and the management of strategy. "This is surprising since, … in addition to the inherent advantages of understanding strategists' own perceptions," it "has the potential to help us explain how the relation between managerial cognitions and managerial practices leads to organizational outcomes" (Paroutis & Heracleous, 2013, p. 935).

Though some research has begun to explore the psychological and behavioral aspects of strategy, the development, management, and implementation of strategy is still considered "as a series of rational and dispassionate activities" (Hodgkinson & Healey, 2011, p. 1501). Consequently, there is a need for a deeper understanding of the mental models that form management and worker understanding of the organization's strategy. Ideally, they should be the same, reflecting the same understanding of the goals of the organization.

This study examines the mental models of management (represented by Chief Information Officers (CIOs)) and workers ("analysts") in the CIOs' IT organizations. These mental models will be extracted as revealed causal models, as described below, and examined side-by-side to explore the similarities and differences between the management and the worker mental models of the organization's strategy.

The Study

This paper examines the difference in the mental models of organization strategy between organization senior IT management (we will call them all Chief Information Officers (CIOs) although not all of the senior IT managers carried that title) and the analysts who work for them. These mental models are in a limited domain of information systems units embedded in larger organizations where its personnel are undergoing significant transitions. The CIOs of these organizations were in the process of developing a strategy for dealing with these transitions, and the analysts were anticipating the changes.

This situation has an important characteristic. The change in IT strategy is a top priority in the organization, placing the situation in the forefront of everyone's mind. The mental models of the transition strategy usually exist as tacit knowledge. This is the unconscious knowledge that experts use as they perform a task, compared to the explicit knowledge used by novices (Cohen, 1991; Singley & Anderson, 1989). In normal times, the CIO and the analysts use tacit strategic knowledge unconsciously and automatically. In research, the tacit knowledge must be "surfaced" as explicit knowledge for it to be

examined. However, times of stress and change are especially effective in surfacing and externalizing tacit knowledge so it can be studied more easily (Serantine & Sexton, 2008).

METHOD (CIO)

The data for this study was taken from historical data collected for an earlier study on IT personnel transition issues [citation removed for anonymity]. The IT personnel transitions that were taking place are similar through all the organizations in the study.

Data was collected from interviews of 50 CIOs across 22 organizations in the United States and in Canada. The Canadian subjects were selected from the Conference Board CIO Council, a national organization of medium and large companies. The initial subjects from the United States were selected with a convenience sample (Stone, 1978) from personal contacts of the researchers with several CIOs. The CIO community is relatively small and tightly knit. The first set of U.S. CIOs identified and contacted other CIOs for the study using a snowball technique (Shanteau, 1992). These CIOs identified and contacted other CIOs and so on. Where the organization did not have an official job title of "CIO" we interviewed the person who most closely fulfilled the CIO role in the organization.

The CIOs were all actively explicitly or implicitly developing strategies for dealing with IT personnel transitions. This small domain, time of strategy development, and time of organizational change made the tacit mental models much more easily accessible. The demographics of the subjects are shown below in TABLE 1. Size refers specifically to the size of the IT organization, not to the size of the entire organization.

TABLE 1
CIO DEMOGRAPHICS

Industry	Size	# of Interviews	Job Title of Interviewees
Energy	1,500	9	CIO, User Manager, IT Directors, HR Director
Food and Entertainment	1,200	7	CIO, IT Directors, HR Director
Military/police	800	4	IT Directors, User Managers
Manufacturing	1,900	4	IT Directors
Government	715	1	CIO
Reinsurance	230	5	CIO, Directors, Service Director
Business Services	215	2	Chairman, CTO
Financial Services	270	2	CIO, Vice President
Education	170	1	Director
Medical Services	23	1	CIO
Military/police	1,500	1	CIO
Mining	70	1	CIO
Education	n/a	1	Dean
Utility	200	1	CIO
Government	2,250	1	CIO
Financial Services	900	1	CIO
Transportation	800	1	CIO & Manager, IT Strategic Planning
Financial Services	80	1	CIO
Manufacturing	270	1	IT Director
Consulting Services	300	1	Vice President
Manufacturing	4,000	3	Vice President (former CIO), Director, Senior Manager
Insurance	1,500	1	CIO

The CIOs were sent a list of questions in advance to allow enough time for them to reflect on the question and to gather data or examples they wished to share. The interviews were open-ended with probes (Rossi, Wright, & Anderson, 1983), and were conducted both in person and by telephone. Each interview took approximately 45 minutes and was taped and transcribed. Summaries of the interviews were sent to the subjects to allow them to review and revise their comments to ensure accuracy and to completely capture their ideas.

This study uses revealed causal mapping (RCM) techniques (Narayanan & Fahey, 1990; Nelson, Nadkarni, Narayanan, & Ghods, 2000) to examine the strategies being used to achieve the organization's goals and thus to explore the underlying architecture. Revealed causal mapping is ideal for this research since it specifically extracts causal relationships that exist in the subjects' minds (Axelrod, 1976b; Fiol & Huff, 1992). In this case, it extracts those causal knowledge structures that describe the cause and effect relationship of the organization's strategy (the cause) and the eventual outcomes (the effect). The process for developing the revealed causal maps is described below.

The first step in the process of creating the revealed causal maps (Nelson, Nadkarni, et al., 2000) has already been performed as described above. The sample has been selected, the interview guide was created, and the interviews were conducted and transcribed. The second step is to identify the causal statements in the CIO interview transcripts. Keywords such as "if-then," "because," "so," and so on are used to identify the causal statements. Further analysis identifies and extracts the causal elements that may be separated by several lines of text. This process was performed by a team of twelve research assistants under the supervision of the authors. Two research assistants were randomly assigned to each transcript. The extracted causal statements were examined for consistency, and any differences were resolved by discussion. For example, one exchange of an interviewer and a CIO produced in the following text:

> Interviewer: Okay sure. So first of all I just kind of look at past transitions that your people have had to make. Looking back, what has been the most challenging transition for your IT staff?
>
> Speaker: I'm trying to put this into sync where I give the movement to one national pipeline and what we're referring to is the **creation of shared services**. Prior to that time, each of our pipelines had autonomous IT organizations and merging them into one global organization created a number of dynamics that has been difficult. We've shut down one of our business units as a result of that. We have **required people to commute** to xxx for three years, because of that. That's probably been **a major driver for attrition**. It's kind of challenged people in our communities and **forced them to make family and work balance life decisions** that they previously had not been confronted with.

Analysis extracted three causal statements:

Cause Phrase	Effect Phrase
creation of shared services	major driver for attrition
creation of shared services	required people to commute
required people to commute	forced them to make family and work balance life decisions

Note that the effect phrase in one causal statement may become a cause phrase in another causal statement. The analysis of the 50 transcripts produced a total of 2,769 causal statements.

The second step of the revealed causal mapping method continues with the development of the coding scheme for the set of causes and effects. (Narayanan & Fahey, 1990). The cause phrases and the effect phrases were combined into a single set of phrases for classification. We used the exploratory approach to identifying conceptual categories (Nelson, Nelson, & Armstrong, 2000) where the concepts were drawn from the text itself rather than using a confirmatory approach where the categories were known beforehand. Three levels of aggregation were used: concept, construct, and category. Again, twelve research assistants

under the supervision of the authors worked in teams of two and were given random collections of causes or effects. The teams independently coded similar causes and similar effects together into concepts. The concepts were given labels that captured the essence of the statements. Any differences between the coders were resolved by discussion. The concepts were combined into constructs which were combined into categories. An electronic card sort was used to validate the coding. Statements, concepts, constructs, and categories were sorted and recoded until a stable classification scheme was achieved. The final result was 353 separate concepts in 37 constructs and ten broad categories. The Concept list for the "Personal Competencies" category is shown below in TABLE 2.

TABLE 2
CONCEPTS IN THE PERSONAL COMPETENCIES CATEGORY

Category	Construct	Concept
Personal Competencies	**Business Competencies**	Business Application Knowledge
		Business Domain Knowledge
		General Knowledge of Business
	Cognitive Abilities	Analytical Thinking
		Business Analysis Skills
		Conceptual Thinking
		Learn New Tech Skills
		Logical Thinking
		Multi-Tasking
		Problem Solving
	General IS Related Abilities	Ability to Follow Through
		Communications
		General Management Skills
		Job Transition Skill
		Methodology Skills
		Multiple Skills Required
		Multiple Tech Skills
		Need to Stay Current
		Organized Work
		Patience
		Personal Initiative
		Personal Skills
		Project Management Skills

The third step of revealed causal mapping is to validate the constructs and concepts that were identified in Step 2. Two methods were used: cross-validation by the researchers and member checks. The purpose of the coding step was to categorize the many different ways the interviewees said the same thing under a single label. The research assistants worked toward agreement on the various categories, constructs and concepts. The researchers also worked independently to ensure that the labels used were in a language that was theoretically meaningful, and that the categories were meaningful and valid on their face.

However, the ultimate validity check is to take the categories, constructs, and concepts back into the field to check their validity with the original respondents. The respondents are asked questions that specifically relate to the phrases they used in the discovery interviews. The questions were open ended but relatively structured. For example, "When you said 'promotions twice a year' (the raw statement in the interview) are you talking about a 'promotion policy' (the concept)?" The coding scheme was finalized after the member check was complete.

A point of redundancy is calculated to ensure that enough interviews were conducted to reveal all the concepts in the map (Axelrod, 1976a). A revealed causal map is created for the first respondent. Respondents are added one at a time and additional concepts are identified. The point of redundancy is reached when the cumulative causal map converges, indicating that no new concepts will be revealed by adding additional respondents. In this study, the point of redundancy was reached at 37 individuals, indicating that the sample of 50 CIOs was more than sufficient to capture all the concepts.

Method (Analyst)

Data was collected from interviews of 83 IT analysts within the largest eight of the 22 organizations in the CIO part of the study. A request for volunteers was sent out assuring anonymity and privacy in their responses. The analysts were given the same questions as the CIOs in open-ended interviews with probes (Rossi et al., 1983). The interviews were recorded and transcribed.

Revealed causal mapping (as described above) was used to analyze the analysts' interviews. Over 4,900 causal statements were identified (vs. 2,769 CIO statements). The same twelve research assistants classified the analysts' causal statements into three levels of aggregation: concept, construct, and category using the same method as for the CIOs. The final result for the analyst revealed causal mapping method was 238 concepts in 21 constructs and seven broad categories. The point of redundancy was reached at 30 individuals indicating that 83 analysts was more than enough to capture all the concepts.

Method (Combined)

The analysts had seven categories: Attitude, Environment, Motivation, Organizational Outcome, Personal Outcome, Personal Competencies, and Corporate Support / Direction. The CIOs had these same seven plus three more: IT Strategy / Performance, Transition, and Future. This is expected as the CIOs were more deeply involved with planning the transition for their IT organization. Problems with Strategy, Transition, and the Future were high priority items.

The final step in analysis was to construct cause / effect matrices for the CIOs and for the Analysts. All cells with less than 50 causal statements were removed to simplify the analysis. The CIO matrix is shown in Table 3 and the Analyst matrix is shown in Table 4.

TABLE 3
CIO MATRIX

Cause ↓/ Effect →	Attitude	Environment	Motivation	Org Outcome	Pers Outcom	Pers Compet	Corp Suppor	IT Strategy	Transition	Future
Attitude					153					
Environment		85		154					114	69
Motivation				85						
Org Outcome										
Personal Outcome										
Personal Competencies					236	54				
Corp Support / Direction				134			143			
IT Strategy / Performance		72		108				124	210	122
Transition (General)										
Future										

TABLE 4
ANALYST MATRIX

Cause ↓/ Effect →	Attitude	Environmen	Motivation	Org Outcom	Pers Outcor	Pers Compe	Corp Suppo
Attitude	76	201				88	114
Environment		634			94	148	138
Motivation		210	184			76	
Org Outcome		165	112			82	74
Pers Outcome	53	522	112		116	164	120
Pers Competencies		150				148	
Corp Support / Direction		166				96	254

RESULTS

Ideally, management and the workers (the CIOs and the analysts) should be "of one mind" when they implement their company's strategy (Gagnon et al., 2008). In this study, we surfaced management's (CIOs) and workers' (analysts) mental models of the organization's strategy for IT personnel transition. The revealed causal models of these mental models are shown below in Figures 1 and 2 and as matrices in Tables 3 and 4.

FIGURE 1
CIO CATEGORY RELATIONSHIPS

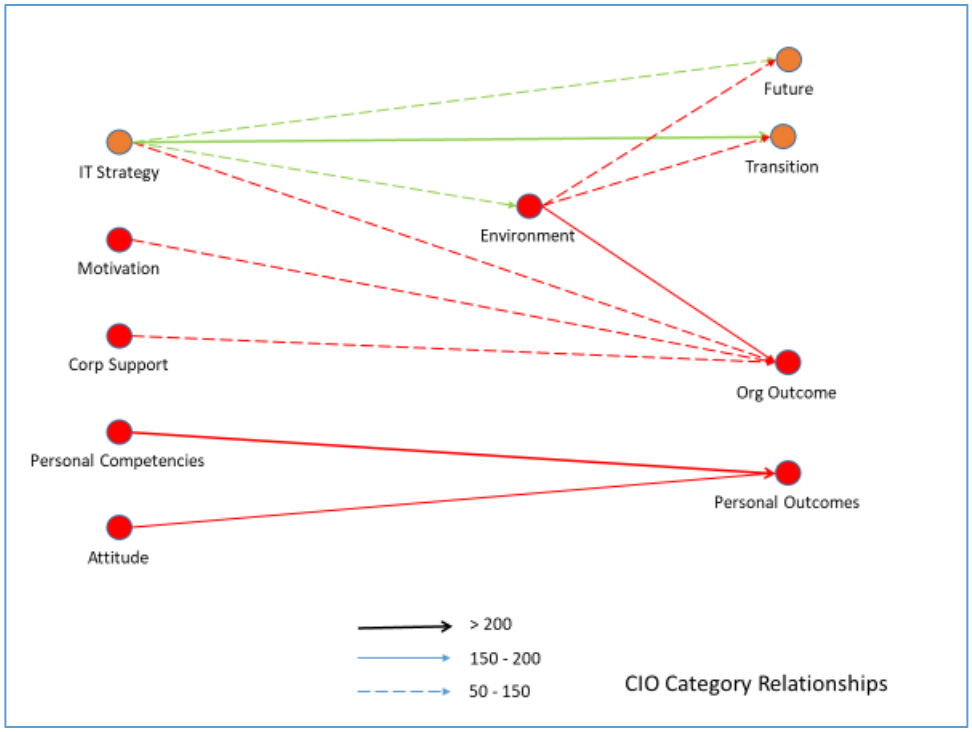
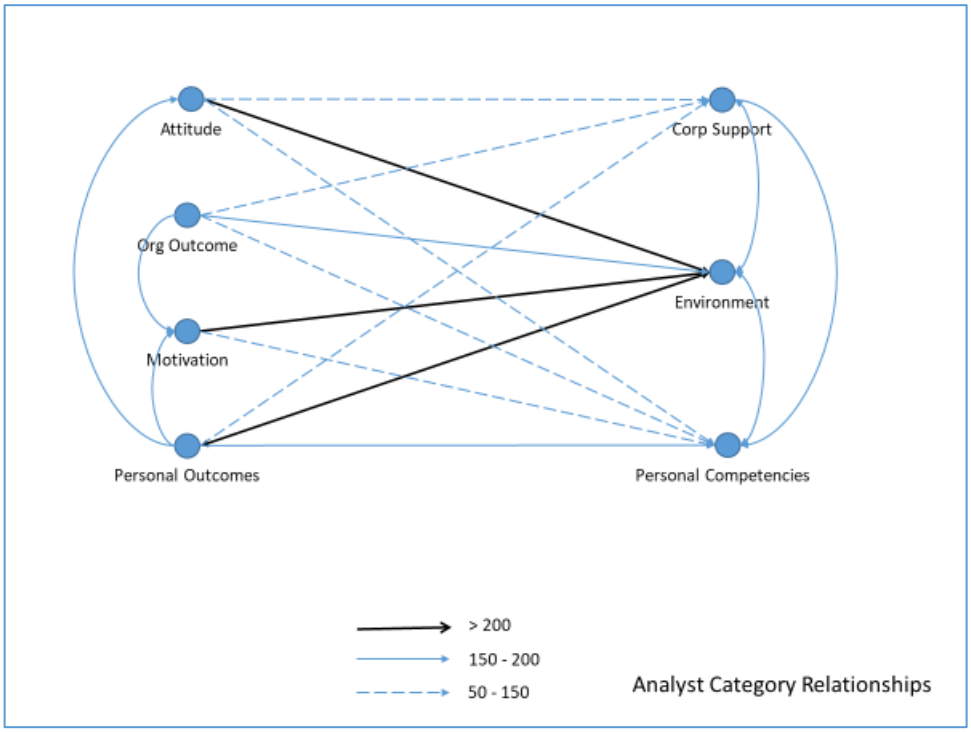


FIGURE 2
ANALYST CATEGORY RELATIONSHIPS



Both the CIO and the analyst causal models have the same seven categories: Motivation, Corporate Support, Personal Competencies, Attitude, Environment, Organizational Outcome, and Personal Outcomes. The most striking difference between the two mental models is in the addition of three CIO constructs: IT Strategy, Future, and Transition. The CIOs are clearly thinking about IT Strategy and how it leads to the Future and to Transitions. For example, one CIO was clearly linking Strategy to the future of the IT organization and its personnel:

> I see the future of IT becoming more and more ingrained throughout all businesses. The concept of a centralized IT department has come and gone over the years. You've been in the business twenty years and you've seen it mature immensely. You've seen it change and go back and forth, through centralized and decentralized and centralized, back and forth. One way I do see the vision or the strategy, the strategy is not intentional okay. It's going to be one of those things that happens and we don't even realize it happening, is that the IT functions are going to become immersed or entwined in every other business function and if you don't have control over your policies and procedures and your change control over your development and deployment, we're going to go back to a helter skelter environment.

Another CIO gets directly to the point with IT strategy, the future, and personnel transitions:

> In terms of kind of core level of ability, I do tend to stress more and more the importance of business education, because I think that technologists really need to understand much more so than in the past, how the technology aligns with the business strategy. And quite frankly, a lot of the learning in that space has traditionally been kind of you know.... on the job and that's not necessarily a bad thing and I really, really hope that in computer science curriculums we see more and more business training and business teaching coming in.

While the CIOs have responsibility for their departments and for implementing the organization's strategy, with that strategy focused on IT personnel transition the analysts are more focused on their own place in the organization. They are concerned with the present and with their own futures. In times of change, employees shift their focus to the present and to managing their own careers (Weer & Greenhaus, 2020)

> Yeah, I think the fear thing is a big factor to anyone worried about their career, because there has to be something they can do to address that. Yeah, a year out of the, you know, learning new stuff is pretty drastic these days.
>
> On the other hand, they cut the jobs. Some of the people I've talked to are having real trouble with the system. I know they'll get them ironed out. There's an awful lot of panic and fear and, in a lot of cases, confusion, I think.

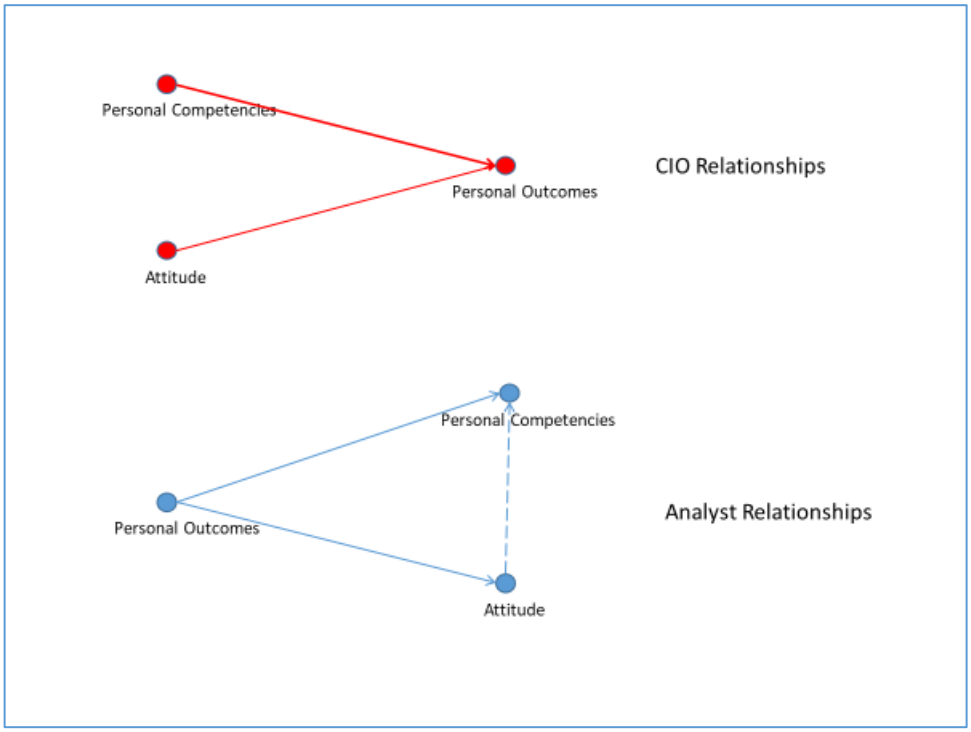
Personal Outcomes: Ideal vs Real

The organization has a strategic goal in mind: transitioning its IT personnel from one development method to another. It would seem natural for those personnel to ask, "What's in it for me?" Management needs to motivate the employee to make the transition for the good of the company, but also needs to motivate the employee by ensuring that they understand it's good for them, too (Conlon, 1980). "Human resources specialists plan strategically, in direct collaboration with the organization's management, training courses and training, so that employees develop their knowledge and skills and contribute to the achievement of a knowledge-based organization" (Panait, 2020, p. 114). Build personal competencies and ensure a good attitude and you will achieve the desired personal outcomes. And indeed, this is the causal model we found in the CIOs shown in Figure 3.

If the employee doesn't have the skills and attitude that lead to the right personal and organizational outcome, this CIO will find someone who will:

> We need people who are willing to learn new things and be excited about learning new things and not just do it because I have to. And they need to be able to quickly learn these things and then apply them because the company is not going to wait. If we can't do that, they'll find an outside firm and they'll bring in a consultant just for that kind of work.
>
> I do believe that the attitude is the most important thing. I think what separates the high performers in new areas from the not so high performers in new areas is the attitudes and I think mostly it's enjoying the challenge. That's what something new is all about, it's challenge.

FIGURE 3
PERSONAL OUTCOMES AS SEEN FROM THE CIO AND THE ANALYST



The analysts see personal outcomes, personal competencies, and attitude in the opposite causal direction as the CIOs. For the analysts, personal outcomes lead to personal competencies and personal outcomes lead to attitude. Additionally, attitude leads to personal competencies. Attitude, such as job satisfaction and regret, can arise from personal outcomes such as career inaction and its increasing impact over time (Verbruggen & De Vos, 2020) leading to lower job performance and other organizational consequences. With change being a personal outcome:

> [About Change] Um, five years ago I would have said I liked it a lot, but I think my attitude about that's changed quite a bit. I don't like it very much any more. I like things pretty much the same. A little bit of change is fine, but radical change is disturbing, certainly.

In the mind of the analysts, personal outcomes such as job success and job satisfaction drive personal competencies such as business skills, problem solving, IT skills, and so on. This is in contrast to the CIOs' thinking and conventional wisdom that personal competencies drive outcomes. For example, for the CIO business skills lead to job satisfaction vs. for the analyst job satisfaction leads to business skills.

> For what skills I have and the background I have it's kind of a waste if I'm not using some of that technical background, so hoping that my skills can be better utilized or at least the company will get more value out of me –getting more back into the technical area.

Attitude (such as anxiety, anger, confidence, and feelings of accomplishment) also leads to building personal competencies. For example, fear leads to building skills.

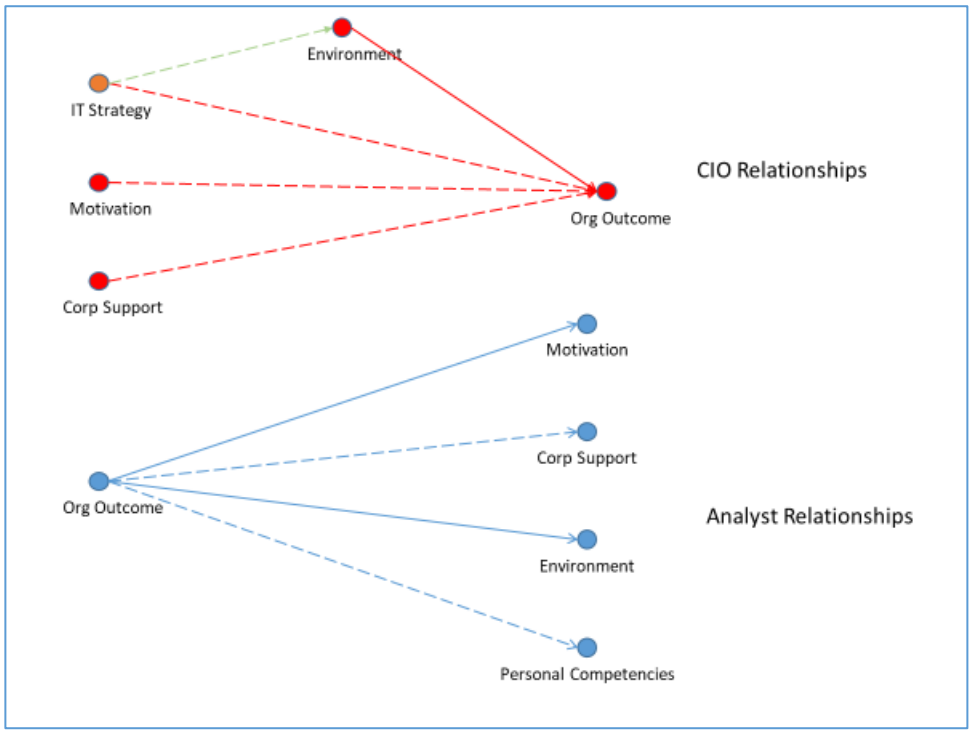
> I'm afraid by the time I get to it, it's going to be gone and that's how fast, to me, the technology is changing. I really feel sorry for the kids now a days because they just learn

something and then they go right to another thing, they go right to another thing, right to another thing and it's really, you don't have a solid background of anything.

Organizational Outcomes

One would think that an organizational strategy means aligning support that leads to the desired organizational outcome. This is indeed how the CIOs' mental models are structured. However, the analysts' mental models are very different. Their causal relationships lead in the opposite direction as shown in Figure 4. For the CIO, corporate support, motivation, IT strategy, and the environment all lead to organizational outcome. For the analyst, organizational outcome leads to motivation, corporate support, environment, and personal competencies.

FIGURE 4
ORGANIZATIONAL OUTCOMES



Like personal outcomes above, the CIOs' mental models follow conventional wisdom. For example, corporate support leads to positive organizational outcomes. For the CIOs, corporate support constructs include direct support for IT personnel, corporate support for IT management, and general personnel policies. The concepts uncovered in the CIOs mental models of corporate support include the availability of training, direct support for transition, growth, and training, and opportunities for more experience, travel, and (again) training. Human resources is critical for delivering this support (McClean & Collins, 2018). The organizational outcome concepts are listed below in Table 5.

TABLE 5
ORGANIZATIONAL OUTCOMES

Business performance outcomes
Corporate contribution
Corporate success (financial, efficiency)
Corporate tech success
Corporate transition
Cost savings
Customer service
Hiring
Organizational Commitment
Productivity improvement
Retention
Training Others

Corporate support and good training leads to good organizational outcomes:

> Let them spend a little time and especially with their customers to understand how a network operates and all those kinds of things so that they can do a better job and being more confident when it comes to negotiation and those kinds of things. Giving everyone the opportunity to understand how the other half lives goes a long ways still. So, it gets back to the whole training thing. If you make people more knowledgeable.... you know, knowledge is power and it gives them the comfort to do a better job.
>
> We also did organization wide training and a pretty healthy stream of investment and tools and technology that they use day to day so that again, they could realize the opportunity that they were looking for, in terms of what the latest and greatest stuff and doing something that mattered.

Similarly, a motivated employee will drive more effectively toward organizational goals. "Motivation is the process by which employees are directed to work towards achieving the set objectives of the organization, the way in which this motivation is realized being understood differently by employees due to the subjective vision of each individual" (Panait, 2020, p. 114). For the CEO, employee motivation takes many forms: availability of work, excitement, fun, challenges, and (negatively) work pressure. The strongest motivator was not compensation and bonuses (Friedlander & Walton, 1964) but rather the challenge and fun of working with new technology as would be expected from IT professionals:

> Very committed... they're very dutiful, that first wave. Less motivated by wage and salary, more motivated by the kinds of technology they're dealing with and its impact on the enterprise.
>
> I think cool technology is another one. Most the type of people we want to hire, want the latest toys and they want to work on the coolest, sexiest stuff and we give them that. We let them create their own culture. They really have a separate culture from the company, which they like.... kind of their own identity as a group and they like that. They're proud of that. Proud of being different... nerds and geeks or whatever and with their own way of doing things in their own way of relating.

The CIOs' mental models also indicate that the organizational work environment leads to positive organizational outcomes. This includes job quality, the physical environment (noise, cubicles, lights, etc.), work schedule, work/life balance, and so on. "Organizational climate has long been established as a critical determinant of organizational effectiveness" (Parke & Seo, 2017, p. 334). Build a good organizational environment, and good organizational outcomes will follow.

> No dress code. That was a case in point. We had a bunch of suits up here and a bunch of really strange people down there on the third floor, but we separated them and let them have their own space and do what they want with it. It worked.... very successful.

The final piece of this part of the mental model is where IT strategy leads directly to organizational outcome and indirectly to organizational outcome through environment. Not surprisingly, IT strategy was not part of the analysts' mental model. It was very much on CIOs' minds. For them, IT strategy was composed of three constructs: IT governance, IT organization strategy, and IT technology architecture and projects. IT governance included concepts such as: outsourcing, telecommuting, staffing changes, and going global. IT organization strategy included the concepts of IT as a service improver, IT as an organizational leader, IT as a strategic driver, and IT's role in the organization. IT architecture had more technical concepts such as architecture practices, benchmarking, business cases, requirements, project management, and distributed components. These are all critical components leading to positive organizational outcomes.

> I think the alignment of IT and the whole message of what is the business value of IT and how can IT be a fundamental component to benefiting the company, increasing shareholder value, reduce in cost, growing the business and at the same time, providing excellent service. I mean, it's a very simple.

The analysts' mental model for organizational outcomes is very different from the CIOs' mental models. Their causal model runs from organizational outcome to motivation, corporate support, environment, and personal competencies. This cognitive mismatch can cause problems when designing a strategy. For example, the CIOs think that by improving motivation, organizational outcome will improve. For the analysts, organizational outcome affects motivation, but *negatively*. This result is consistent with prior research (Friedlander & Walton, 1964).

> At times it frustrates me. And at times there's a benefit to it, so I guess it's kind of a wash. We don't get every new half-baked technology; at the same time, we don't get the very newest technology either.

> The in-house training is poor (poor in quality or poor in availability?) primarily in depth and then outside the company, it's difficult to get the budget to go off and get the current training. I say that having been sent to something recently, but it was very difficult to get that budget approved.

Similarly, organizational outcomes negatively affect environment and personal competencies. For example, the needs of the company negatively affect the needs of the analyst:

> I mean, our systems right now are mainframe, the old skills plus the new skills. So you have to, you have to transition into those teams in hopes that you learn enough skills to keep productive when the systems finally die. So, I think it's commitment to people, a known commitment that when these systems die you will be retrained, you know, in a formal manner. In the last few years, I think they've really lost their people skills and I feel they are trying to get further away from the family environment, I feel like they treat us more like we're

> all replaceable, so therefore just accept what we say and that's it. I'm not real happen with the way things are presented.

However, the analysts' mental model has organizational outcomes positively affecting corporate support. Corporate support includes concepts such as corporate credibility, stability, culture, and direction.

> I think they're going at a good clip, you know. I mean, the things that I've seen, the putting their parts, ordering of the web, it's just a neat idea. They are trying to put in standard practices with a packaging uh they're modifying the hell out of it, which could cause problems. So I think they're moving in the right direction. They seem to be responding to change.

The Environment

The remaining causal models for both the CIOs and the analysts are relatively similar. While the primary causes and ultimate effects are different, the organizational environment plays a central role. For the CIOs, IT strategy leads directly to the future and to transitions, all concepts that are found with the CIOs and not with the analysts. IT strategy also indirectly affects the future and transition through the organizational environment. For the analysts, attitude, personal outcomes, and motivation strongly affect the environment which, in turn, affects corporate support and personal competencies. These causal relationships are shown in Figure 5. The complete set of concepts included in the organizational environment is shown in Table 6.

FIGURE 5
THE ORGANIZATIONAL ENVIRONMENT

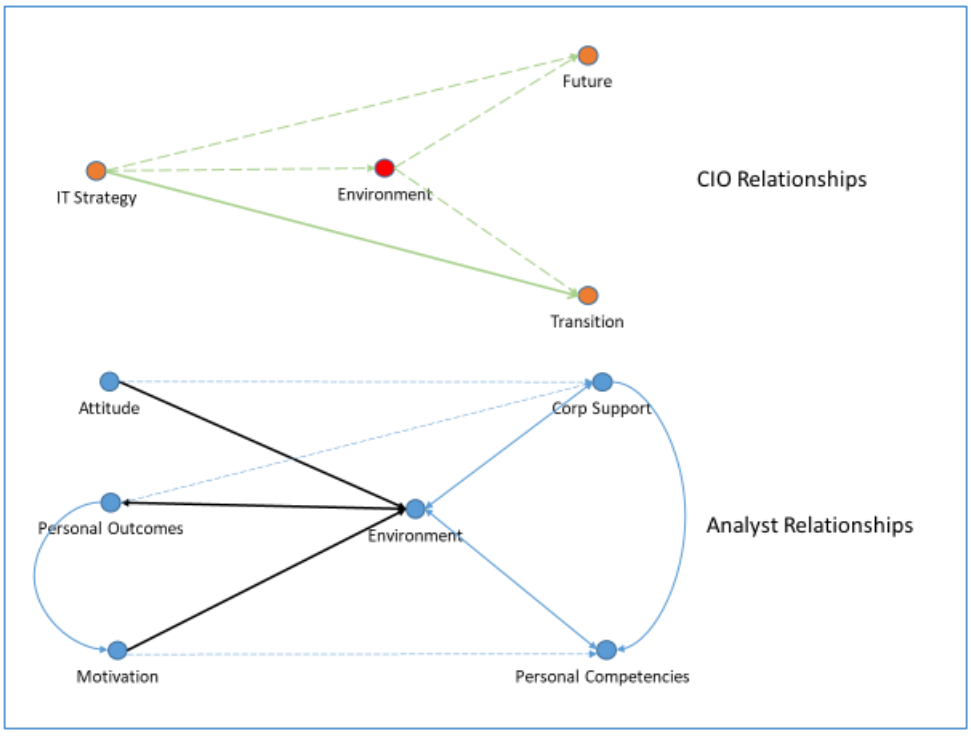


TABLE 6
THE CONCEPTS OF ORGANIZATIONAL ENVIRONMENT

Aging Workforce	Availability of resources
Cross functional teams	Availability of knowledge
Concentrated Talent	Barriers to change
Communication with co-workers	Change
Excess employees	Environmental complexity
Morale	General work environment
Organizational Structure	Pace of change
Politics	Pressure to change
People environment	Reason for (Type of) Change
Seniority	Shared knowledge
Teamwork	System specific environment
Virtual teams	

DISCUSSION

This paper explored the mental models of management (CIOs) and workers (analysts) as their organizations developed and implemented a strategy for transitioning its IT personnel as the organizations' technology changed. Fifty CIOs and eighty-eight analysts across twenty-two organizations were interviewed, where all the organizations were facing the same problem of implementing IT personnel transition strategies. Ideally, the CIOs and the analysts should be "on the same page" in their understanding about how things work. Unfortunately, this was not the case.

The CIOs mental models matched the standard concept of strategy. The CIOs focused on the analysts' outcomes: organizational outcomes and personal outcomes. These are achieved through motivation, corporate support, personal competencies, and the workers' attitude. The causal model indicates that improvements in these elements would result in improvements in outcome for their personnel. In addition, a good IT strategy would lead to a successful transition and improvements in the future.

The causal model showed a strong causal relationship between IT strategy and successful transition, and a strong causal relationship between a workers' personal competencies and their personal outcomes. There is a slightly weaker causal relationship between attitude and personal outcomes.

The importance of considering the environment during strategic development is well known (Hofer & Schendel, 1978; Shinkle, Kriauciunas, & Hundley, 2013). The corporate environment has a causal relationship to the future, transition, and organizational outcomes. The CIOs saw that IT Strategy can affect the environment, but at this high level it is difficult to determine whether the environment is the organizational environment or the more local IT environment.

However, for the CIO, the environment is an important factor in achieving the organizational outcome. This is consistent with research that examines models of strategies for organizational change (Alas, 2007). The CIO also distinguishes between the various environments. The job environment and the organization's personnel policies are very important. The technical environment is slightly less important, and the individual's environment, the technical environment, and the overall people environment round out the environmental causes.

The CIOs have a disconnect between organizational outcomes and personal outcomes. It appears that the things the CIOs can control (corporate support, IT strategy, and motivation) lead to organizational outcome. The things that are somewhat less controllable (personal competencies and attitude) lead to personal outcomes. Looking deeper at the concepts behind the constructs, we see that personal competencies are made up of three primary elements: business application knowledge, business domain knowledge, and a general knowledge of the business.

Attitude is made up of many different elements that the CIOs may find difficult to manage. Perhaps it was the upcoming transition, but the analysts' attitude concepts were mostly negative, as shown below in Table 7. Attitude has been seen to be very important during times of transition (Choi, 2011), and the analysts' attitude is not good.

TABLE 7
ATTITUDE CONCEPTS

Anxiety	Desire for New Opportunities	Panic
Acceptance of change	Desire for stability	Positive General Attitude
Anger	"Fit" w/ Corp	Perception of training
Acknowledgement of need for continual learning	Fear	Resistance to Change
Attitude toward change (tech or personal)	Feeling lost	Reality denial (old system going on forever)
Attitude toward people	Frustration	Risk Taker
Caution	Honest	Trusting
Confidence	Job influence	Work Ethic
Corp perception	Lost	Work identity
Curiosity	Not Enthusiastic	

The analysts' mental models, in contrast to the CIOs' mental models, were much more self-centered. As shown in Figure 3, personal outcomes lead to personal competencies and attitude. In Figure 4, organizational outcomes lead to motivation, corporate support, the analysts' environment, and their personal competencies. Where the CIOs were looking forward to strategies for organizational outcome, the analysts were looking for how those organizational outcomes would affect them.

CONCLUSION

When two diverse groups are both involved with implementing a new strategy that is critical for the organization, it is critical for those groups to be working toward the same goals and to have the same causal model firmly in mind for what leads to those goals. In this paper we saw mental models for management (CIOs) and workers (analysts) working toward implementing a strategy for transitioning the IT personnel to a new technology. They were clearly not in agreement as many of the causal elements of the employees showed frustration and fear.

This study used historical interviews from previous research. While the interviews did focus on the IT transition strategy, they were not perfect in surfacing strategic mental models that could be compared. However, this study does demonstrate the procedure for exploring mental models and for identifying where conflicting mental models might cause problems when implementing a new strategy.

Where management may have been deeply involved with crafting the strategy, it's up to the workers to implement it. If the workers' mental models are surfaced and examined early enough, education programs can be crafted to specifically address their concerns and bring their mental models more in line with management plans.

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