Presumed Versus Actual Organizational Culture: Managerial Implications for Implementation of Information Systems

N. Pliskin,* T. Romm,† A. S. Lee‡ and Y. Weber§

*Department of Industrial Engineering and Management, Ben-Gurion University of the Negev,
PO Box 653, Beer-Sheva 84105, Israel and Computer Information Systems Department, Suffolk
University, Boston, MA 02108-2770, USA
†Department of Management, University of Wollongong, Wollongong, Australia
‡Department of Quantitative Analysis and Information Systems, University of Cincinnati,
Cincinnati, USA
§School of Business Administration, Hebrew University, Jerusalem, Israel

This paper builds on Markus and Robey's four-level framework of analyzing resistance to implementation of information systems. The four levels of analysis pertain to the user, the organizational structure, the political power and the environment. We suggest adding a complementary fifth level pertaining to the organizational culture. The paper proceeds from a definition of culture to an explanation of its dimensions, in line with the management and control approach to culture. A case study of an attempt to implement an information system is presented and the five levels of analysis are used to explain the implementation failure. In particular, failure is attributed to a clash between the cultural presumptions embedded in the system design and the actual culture of the implementing organization. The concluding section contains recommendations for practitioners and suggestions for additional research on the role of organizational culture in implementation of information systems.

1. INTRODUCTION

Implementation researchers and practitioners in the field of Management Information Systems (MIS) include organizational validity as well as technical validity in analyses of MIS projects [34]. The formal distinction between technical and organizational validity can be traced to Schultz and Slevin [53], who view both types of validity as relevant to implementation of Operations Research models in the managerial environment. Technical validity, in MIS, pertains to technical features such as response time, system design, screen layout or complexity of the supported task [24]. Organizational validity, including micro and macro aspects, concerns the interaction between the organization and the MIS [34]. Organizational validity covers the following micro aspects: user motivation [28, 30], user familiarity with the task [23], user satisfaction, user quality of life [17], user involvement [11] and user cognitive style [38, 47, 57]. It also covers the following macro aspects: organizational hierarchy and channels of communication [30, 44, 45], organizational distribution of power [4, 14, 30–33, 46, 56], deployment of information systems as strategic weapons within the organizational environment [36, 60], and organizational culture [5, 33, 41, 42, 49].

In an article entitled 'Power, politics, and MIS implementation', Markus [31] developed and tested an explanation for the resistance of organizational particip-ants to the implementation of an MIS. Her argument was that such resistance cannot be explained adequately in terms of the system alone (e.g. poor ergonomic design) or in terms of the people alone (e.g. a cognitive style that is intuitive rather than analytical). An explanation of resistance must also consider the role played by politics, which may arise in the interaction between the system and the people.

Markus focused her attention on the distribution of power typically found among subunits and participants within an organization. If the operation of a new MIS were to require a change in the existing distribution of power, then those subunits and people who would lose power could be expected to resist the implementation. Markus' conclusion was that the absence of resistance requires, as a necessary condition, a 'fit' between the distribution of power which the design of an MIS presumes to be present in the organization and the distribution of power which is actually present in the organization. Conversely, a mismatch between the presumed distribution of power and the actual distribution of power would lead to resistance and, possibly, a thwarted implementation.

Mumford and Sackman edited a book [41], on human choice in MIS, in which several authors advocate ana-lysis of cultural aspects in the area of MIS. This suggests that Markus' interaction theory can be enhanced by a complementary interaction theory pertaining to organ-izational culture. This article will investigate the con-

sequences of a mismatch between the culture *presumed to be present* in the user organization during the design of an MIS and the culture which *was actually present* in the user organization. The cultural interaction theory, like Markus' political interaction theory, will maintain that resistance to an MIS cannot be explained adequately in terms of the system alone or the people alone. In addition, any explanation of resistance must consider the role of culture conflict which may arise in the interaction between the system and the people. In a case study of an actual MIS implementation, which this article will examine, a culture clash between the *presumed* organizational culture and the *actual* organizational culture led to user resistance and thwarted implementation. In other words, during the attempted implementation, the friction between the presumed and the actual cultures gradually eroded support for the system.

Section 2 will provide a definition of the concept of organizational culture. Section 3 will present a theoretical discussion on the place of organizational culture in analysis of MIS implementation. The discussion will lead to the conclusion that the next step the research on MIS implementation should naturally take is an investigation of organizational culture. Section 4 will review the key aspects of a case study describing an actual MIS implementation. Section 5 will analyze the facts of the case study in light of the article's theoretical framework pertaining to organizational culture. The article will conclude with recommendations for practitioners and with suggestions for future research on organizational culture and MIS implementation.

2. A DEFINITION OF ORGANIZATIONAL CULTURE

Because the term 'organizational culture' has been conceptually difficult to define, there are a number of different definitions with no consensus emerging among theorists [1, 3, 55]. According to Davies, the literature in this area can generally be divided into two major approaches [10, 11].

The first approach to culture is the descriptive, interpretive or anthropological approach [35]. Its purpose is to understand how culture is represented in organizations. There is no attempt to use the knowledge to change organizations through culture management. Although this approach often relies on description and interpretation alone, there have been several recent attempts to use it as a basis for action research via the Soft Systems Methodology [6, 8, 10, 11]. This methodology, while attempting to record the elements of structure and process in the organization, 'encompasses but also transcends the logic of situations; its focus is the cultural processes which lead to purposeful action' [7, p. 831].

The second approach, which views the organizational culture from a normative stance, is the management and control, or functional approach. It assumes that, it is useful to study the culture, by observing informal needs and behavioral characteristics, when trying to manage organizations effectively and improve their performance [12]. The two approaches to culture are distinct and most researchers use either one or the other. In this article we employ the management and control view of organizational culture, because it fits in very well with our interest in the effective implementation of information systems in organizations.

Culture is defined in this paper, according to Sathe [50, p. 10] and many other theorists, as 'the set of important assumptions (often unstated) that members of a community share in common'. These assumptions, in an organizational context, result from a number of important experiences shared by groups of people. For example, the management team in a particular company have shared experiences in the process of solving problems. Problem solving is necessary to compete and to survive in their firm's social, political, technological and economic environment [16, 51].

Organizational members may share two principal types of important basic assumptions: *beliefs and values* [50].

Beliefs include facts about the world and how it actually works, as well as cause/effect relationships [58]. For example, managers in a given firm may believe that a certain level of long-term debt might lead to bankruptcy and therefore conclude that the level of debt should be lower [59].

Values are basic assumptions about which ideals are desirable or worth striving for. Values do not necessarily reflect what people want or desire, but what they feel they 'ought' to want or think it proper to want. Thus values represent preferences for ultimate end states [37, 48, 50, 51]. For example, top management in a given firm may value a zero-level of long-term debt, but may permit a higher level under the *belief* that this higher level is still below that which might lead to bankruptcy [59].

All of the assumptions held by members of the organization interrelate to form the culture that shapes decision-making processes and influences specific choices and behaviors [13, 50, 54]. The inter-related sets of assumptions that form culture act as a filter through which the organization's members perceive the realities facing their organization. This filter serves two essential functions: one is to translate a world that can be overwhelmingly complex and ambiguous into comprehensible and familiar terms, the other is to provide continuity and stability when change threatens to undermine the lessons of experience [2, 27, 43, 55].

What is required to investigate organizational culture? Laboratory research and industrial studies have isolated several important dimensions of culture [59]. In an extensive literature review we found that there is no agreement on what are the most important dimensions [12, 18, 20–22, 51, 52, 59]. However, seven measures are common to many studies [13, 21, 51, 54], and have been used with high levels of reliability and validity [15, 59].

These measures relate to *beliefs* and *values* concerning the following:

1. *Innovation and action orientation.* The urgency of taking actions and the importance of encouraging innovation and rapid response to changes in the environment.
2. *Risk taking.* The importance of taking risky decisions such as investment in new ventures, purchase of manufacturing equipment and handling employee pension funds.
3. *Integration and lateral interdependence.* The importance of cooperation (instead of competition) and communication among organizational subunits in order to achieve overall organizational goals. This is reflected in the amount of encouragement given to sharing information and to mutual understanding of difficulties.
4. *Top management contact.* The nature of manager–subordinate relations: whether subordinates should receive managerial support, warmth and consideration, and whether open expression of criticism by subordinates should be acceptable.
5. *Autonomy in decision making.* The importance of delegating responsibility for important decisions. This influences how broadly or formally managerial procedures are defined.
6. *Performance orientation.* The nature of demands that are placed upon organization members: whether performance expectations should be clearly defined, whether subordinates should be held accountable for their performance and whether performance appraisals should be formal.
7. *Reward orientation.* The nature of pay: whether subordinates should be paid competitive and equitable salaries, and whether compensation should directly relate to performance.

3. ORGANIZATIONAL CULTURE AND MIS IMPLEMENTATION

Markus and Robey [34] identify four levels of analysis concerning resistance to an information system in the organization implementing it.

The first level of analysis, the *user-system* level, is concerned with 'the degree of fit between users' psychological characteristics and system design attributes' [34, p. 209]. The following topics investigated by the research on MIS implementation fall into the user-system level of analysis: user involvement, user motivation, user satisfaction, user quality of life, user cognitive style and other factors which focus on the individual user [17, 19, 28, 29, 38, 47, 57, 61].

The second level of analysis, the *structure-system* level, is concerned with 'the match between the structural characteristics of an organization and different system design attributes' [34, p. 209]. Underlying the research in this area is the assumption that organizational 'subunits or actors are behaving in ways that contribute

beneficially to the welfare of the organization as a whole' [34, p. 211]. Accordingly, the organizational structure exists to support this behavior [30, 44, 45].

The third level of analysis is the *power-system* level. 'While an information system may validly fit the organizational task and users' needs and cognitive styles, it might be resisted because it causes a redistribution of power unacceptable to those losing power' [34, p. 210]. Validity at the power-system level requires compatibility between the power distribution which the MIS designers presume to be present in the organization and the power distribution which is actually present in the organization. The research in this area regards individuals as acting to advance their own self interests—behavior which may or may not contribute to the welfare of the organization as a whole [4, 9, 14, 23, 29, 31–33, 46, 56].

The fourth and last level of analysis, the *environment-system* level, is concerned with 'the fit between system design characteristics and the environment of the organization in which it is used' [34, p. 211]. Markus and Robey concede that they can identify no research in this area. However, research on the deployment of information systems as strategic weapons would appear to fall into this category. A strategic information system which allows an organization to gain competitive advantage would possess organizational validity at the environment-system level, while an information system which prevents an organization from catching up to its competitors would lack this type of organizational validity [36, 60].

The premise which this article follows is that management information systems are 'culture bound'. In other words, the same MIS can have different meanings for different people, such as system designers and end users. The particular meaning will be derived from the culture of the group, the organization, or the organizational subunit of which the individual is a member. Hedberg and Mumford [17] in a paper discussing 'Man's vision of man as an integral part of the systems design process', brought forward the notion that

> systems are designed in terms of a vision of man and man's needs and abilities which is greatly influenced by the systems designers own values, training and experience. In a situation where the potential users of the system may lack time, EDP knowledge, and perhaps the motivation to become involved in the design process, the systems designer is left to create his own organizational reality and this may not coincide with the reality of people in user departments. [17, p. 34].

In this article we accept Hedberg and Mumford's insight, and note that at least some aspects of what they refer to as 'organizational reality' are captured in organizational culture. In other words, we believe that no MIS has a single objective 'correct' meaning invariant across all organizations, but a meaning that is affected by the interaction between the culture which designers presume to exist and the actual culture in the organization.

We believe that analysis of organizational culture, jointly with analysis using the above four levels, can add depth to the understanding of MIS implementation and
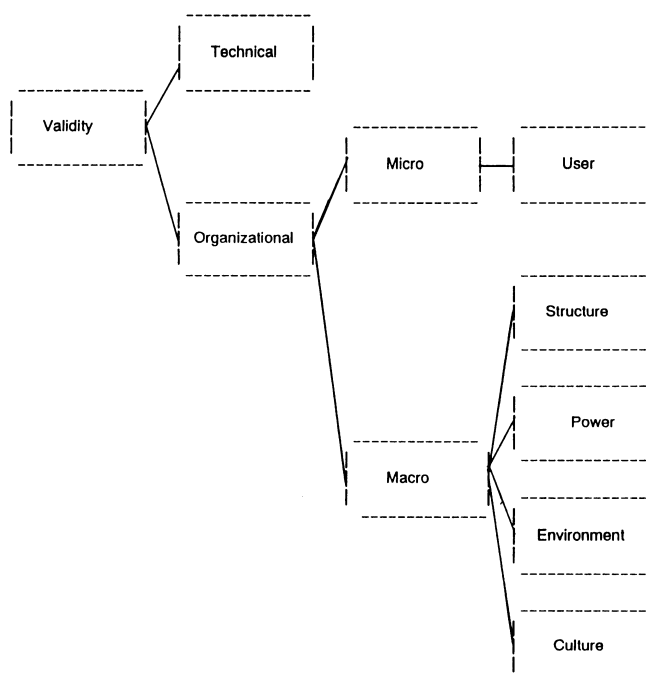
FIGURE 1. Levels of analysis and MIS implementation.

checking of historical details, exploration of discrepancies and a probe into perceptions of the implementation.

4.1.1. Textual analysis

We collected a variety of documents used by CASG in the various stages of implementation at CC. These, including promotion brochures, training materials, and minutes of meetings between CASG and CC staff members, were made available to us by CASG as well as by the personnel department at CC. Also, documents such as CASG promotional materials (brochures and software demonstrations) and internal CC documents (organization chart, company correspondence, and company progress reports) were utilized.

4.1.2. Questionnaires

CASG personnel conducted surveys at CC as they did in other target organizations. Two of these, the 'moral survey' and the 'need survey', were especially relevant to our study. CC's personnel department also conducted surveys throughout the implementation period. We gained access to data from both sources and extracted some qualitative evidence on user expectations and on user satisfaction at various stages of implementation.

4.1.3. Interviews

In-depth individual interviews with more than 20 individuals were a major element of data collection for the study. At CASG we interviewed two senior managers, four project managers (three of whom were directly involved with the CC implementation and one who was only peripherally involved) and several other staff members. At CC we interviewed the two directors of personnel that were sequentially in office throughout the duration of the implementation, several members of the personnel department, and representatives of the management hierarchy ranging from a vice president, through plant managers, to some foremen and operators. Interviewees (both CASG and CC participants) were gradually recruited as the interviewing process progressed. In addition to gathering personal details (such as background, careers, and future plans) interviewees were asked to describe the quality of work life while the implementation took place, staffing, relationships, and areas of responsibility. To increase reliability in data collection and analysis, two of the authors were always present in open-ended personal interviews that lasted about 100 minutes each. The interviews were taped, transcribed, and analyzed by the authors.

increase the probability of success. Hence, as can be seen in Figure 1, we propose to expand the Markus and Robey framework to include an approach focusing on the *culture* of the organization. This fifth complementary level of analysis, the *culture-system* level, is concerned with the fit between the organizational culture presumed in the design of the system and the actual organizational culture in the implementing organization. The five levels of analysis will be applied later to the following case.

4. THE CASE STUDY

4.1. Data collection

The case study deals with an MIS implementation at Chemical Company (CC), which had contracted an external firm, Computerized Appraisal Services Group (CASG), to implement the Employee Evaluation System (EES), a system that supports the personnel management function. (All names have been altered to preserve anonymity.)

Data for this research were collected by two of the authors, one of whom had been a member of CASG in the past and was able to gain access to material that would otherwise have been inaccessible. Major emphasis, during data collection, was put on all levels of implementation analysis, particularly on identifying contrasting orientations of culture along the seven dimensions of organizational culture.

Textual analysis, questionnaires, interviews and observations were employed in the study [39, 40]. These various means were complementary and mutually supportive. For example, observations were a source for interview questions while the interviews enabled cross-

4.1.4. Observations

Since one of the authors was employed by CASG during the CC implementation, she was privy to many negotiation and discussion meetings between CASG and CC personnel. We were also invited to post-project meetings at CC and at CASG, in which the implementation was discussed in retrospect. Furthermore, since most inter-

views took place at CASG and CC, there were additional opportunities for observations.

4.2. Case history

CASG personnel had successfully implemented EES at more than 20 industrial and service organizations. Their first and only failure to implement EES occurred at CC. CC is a medium-sized chemical company. It employs 1250 workers: 80%, including plant managers, at the plants (which are modern production facilities located close to the sources of raw materials) and 20%, including top management, at the main offices (which are in a town, about 1h drive away).

CC's organizational structure is fairly conventional, except for one noteworthy observation concerning the status of the plant managers: on the one hand, lower management levels perceive plant managers as powerful top managers; on the other hand, plant managers are not truly integrated with the rest of top management, perhaps because of the geographical distance. Thus, the company is characterized by:

1. A strong, centralized leadership at the level of the president, the four vice-presidents and the three directors.
2. Relative independence of semi-top-level plant managers.
3. Rather informal and friendly relationships at the middle and low management levels (i.e. department heads, unit heads and foremen).

In 1981, following a strike after 30 years of excellent working relationships, the director of personnel at CC, with the backing of the president, approached CASG about EES implementation. It was hoped that EES would help management in responding to union pressures for improving evaluation, feedback and promotion processes. Top management at CASG viewed this initiative as a strategic opportunity to penetrate non-sophisticated industries, starting with CC.

CASG personnel made it clear at the outset that EES was but one module in a series of products (such as promotion and feedback modules) that ought to be implemented together. CC declared its intention to gradually implement all modules. An agreement was negotiated and late in 1981 a contract was signed between the presidents of CC and CASG. According to the contract, a CASG team was to map the organization structure, design the personnel evaluation questionnaire and create the evaluation database. A young and energetic CASG member was selected to lead the project. She spent most of the time on CC premises and viewed her mission as a combination of a sales assignment and organizational research. In early 1982 she, jointly with other CASG analysts, conducted a series of in-depth interviews covering a representative array of CC personnel. CASG staff members enjoyed the full cooperation of management, plant managers in particular.

Pilot runs of EES occurred during 1982. After improving and finalizing the appraisal questionnaire, the finalized appraisal questionnaire was administered throughout the plants and the main office with the exception of vice presidents, directors, and plant managers. By mid-1983 CASG personnel conducted the first complete cycle of appraisals and processed the CC performance data. They delivered to CC not only detailed evaluations for each employee, but also summary reports on employees in the top 10%, employees in the bottom 10%, improving employees, deteriorating employees and employees with managerial potential.

During early 1984, following another evaluation cycle, CASG staff members began to hear complaints within CC that the information associated with EES (both input and output) was never used. In response, the CASG team approached the president of CC and suggested that advancement and compensation processes be linked to EES products. The president, after consulting with the union and the director of personnel, had instructed CC managers to base their recommendations for promotions on the appraisal reports they received from EES. However, as became evident later on, his subordinates ignored this directive and performance appraisals had no impact on actual promotions.

CASG personnel then explained to the president that EES dealt with subjective judgments about people and therefore, without human feedback and cross validation, data quality was bound to deteriorate. Data quality control, they claimed, could be provided by the feedback embedded in one of their complementary products, Computerized Evaluation Interviews.

In the spring of 1984 the president of CC gave his consent for CASG to run workshops to train managers in Computerized Evaluation Interviews. During two rounds of the workshops, which took place in the spring and fall of 1984, several signs of resistance to the computerized appraisal emerged. Managers argued that evaluation interviews were too formal for CC, especially since they were communicating anyway with workers on a regular basis. Furthermore, they felt that since union contracts did not leave much room for selective compensation or firing of workers, evaluation interviews might create unrealistic expectations among the employees. These expectations, in turn, could cause frustration, unrest, and hostility among workers, and could lead to a strike.

CASG personnel observed only isolated and sporadic instances of managers' collaboration on Computerized Evaluation Interviews. Toward the end of 1984, it became apparent at CASG that the EES project at CC was on the verge of failure. At that point, the director of personnel publicly expressed doubts as to the importance of an evaluation system at CC. The president began to distance himself from meetings with CASG representatives, and the plant managers gradually began to voice their opposition to the project.

The annual evaluation cycles continued during 1985,

1986 and 1987. At the beginning of each year, CASG personnel organized discussion groups to review organizational goals and determine the extent to which these goals had actually been realized. The CASG team shortened the appraisal questionnaire at the request of managers who found it too long and time-consuming. Still, despite all this effort, CC terminated its contract with CASG by the end of 1987.

Termination of the project at CC had catastrophic ramifications for CASG and its parent company. Long-term strategic considerations (i.e. penetration into new and less sophisticated market segments) had led CASG management to invest heavily in the project. Project termination hurt overall profitability to a great extent. Moreover, the strategic objective was not met; neither the chemical industry nor other non-sophisticated industries joined CASG's client base. This, in turn, forced CASG to seek markets abroad at great expense. In addition, at the end of the project, all CASG staff members affiliated with the project either resigned or were fired. The resulting financial and human drain led to a significant reduction in CASG activities until it was finally absorbed by its parent company.

5. AN ANALYSIS OF THE FACTS OF THE CASE STUDY

How might we explain CASG's failure to implement EES at CC, given its successful track record in previous and subsequent implementations in other organizations? Also, why did it take so long to realize that the EES implementation at CC was failing? CASG and its mother company certainly had to gain from a successful implementation and, on the surface, so did CC. After all, EES would have automated record-keeping procedures, provided quick and easy access to up-to-date performance data and executed tasks which were not previously possible (e.g. speedy data analyses involving statistical models applied to large data sets). Moreover, since CC operated in an environment marked by a shortage of workers, EES could have provided a competitive edge in recruiting. Despite all this, EES implementation at CC had failed.

This section is devoted to showing how the four levels of analysis offered by Markus and Robey, combined with the culture-system level, help explain the resistance to EES within CC. For each level of analysis, we contrast assumptions made by the CASG team against realities at CC.

5.1. The *user-system* level of analysis

No problems emerged at this level of analysis because, in this case, use of EES by CC members was indirect. The users had no direct contact with the system. They had no role in actual input or output activities. The remote location of the system at CASG offices, with CASG personnel solely responsible for data entry, processing and reporting, shielded the user from direct interaction with the system. Therefore, user-system factors could not emerge as problems.

5.2. The *structure-system* level of analysis

CASG representatives took more than a year to study both the formal and informal organizational structure of CC in an effort to achieve a fit between the organizational structure and the system. However, the CASG team made the critical assumption that a strict hierarchical, formal and unambiguous structure existed at CC. In reality, the CC structure presented a significant departure from this assumption in containing an informal and ambiguously distributed collection of semi-autonomous sub-organizations. In fact, CASG personnel relied on the president's initial enthusiasm for EES but learned during the implementation years that his subordinates could and did resist his directives.

5.3. The *power-system* level of analysis

CASG's expertise in organizational development together with its previous experience in EES implementations had created an awareness of political factors. At CC, the CASG team maintained continuous and intensive contact with managers at all levels and, in particular, with plant managers. CASG personnel devoted extra attention to plant managers and held weekly orientation meetings with them to guarantee user involvement. Unfortunately, CASG staff members underestimated the political power that plant managers have gained due to the informal relationships within their plants and the geographical distance from the main offices. In fact, plant managers perceived EES as a threat to the existing distribution of power which they wanted to maintain. They were concerned that a successful EES implementation would lessen their political power since EES information would be available to all levels of management, thus hurting their ability to determine subordinates' future careers. Furthermore, since plant managers could not show opposition publicly (and safely) against the president (who supported the implementation at a distance), resistance to EES presented a relatively safe way to oppose the president without risking their necks.

5.4. The *environment-system* level of analysis

At the outset, there seemed to be an excellent fit between the environment and the system. EES seemed to provide CC with a major competitive advantage. All chemical manufacturers in the region recruited their employees from a rather limited supply of managers and workers. Knowing this environmental reality, the CASG team promoted EES as capable of improving CC's ability to attract and retain manpower better than the competition. In fact, many managers believed the opposite; they viewed EES as a detriment in the competition over manpower because of its potential disturbance of the fragile balance of power among managers and workers at CC.

5.5. The *culture-system* level of analysis

We now list the seven major dimensions of culture and show the contrasting orientations between presumptions and realities.

1. *Innovation and action orientation.* CASG personnel presumed that to achieve maximal profitability, innovation and action orientation prevailed at CC. This presumption contrasted with the realities at CC. Favorable environmental conditions allowed CC to act conservatively and still maintain a rather successful status quo without orientation toward innovation and action. In fact, resistance to EES persisted because, among other reasons, it was perceived by many CC managers to be an innovative action.
2. *Risk taking.* CASG personnel presumed that risk taking was encouraged at CC. This presumption contrasted with the realities at CC. CC enjoyed full control over its supply of raw materials and experienced a relatively stable demand for its products; therefore it could maintain success without risk taking. In fact, on the basis of shared experiences, CC managers believed in playing it safe and therefore were unwilling to implement EES when it began to be perceived as a danger to stable labor relations.
3. *Integration and lateral interdependence.* CASG personnel presumed that management at CC was centralized and that formal horizontal communication prevailed. This presumption contrasted with the realities at CC. While in each of the CC plants, informal communication was of high quality, the semi-independent plant managers and were not truly integrated within top management at the central offices. In fact, EES formalities and information-sharing were neither desired within the plants (communication was intense anyway), nor did they foster communication within top management of CC (plant managers cherished their independence).
4. *Top management contact.* CASG personnel presumed that the president was supportive of plant managers and tolerated criticism. This presumption contrasted with the realities at CC. The president, while expecting plant managers to conform to his directives, distanced himself from them. In fact, resistance to EES was just another matter in which plant managers functioned semi-independently. Despite the president's support for the project, they opposed it. The attempts of the CASG team to cater to the needs, desires, and expectations of the plant managers were too little and came too late.
5. *Autonomy in decision making.* CASG personnel presumed that autonomous decisions regarding subordinates were encouraged and, in particular, that all organization members were entitled to interview and be interviewed, and that managers at all levels had the privilege of evaluating their subordinates and recommending promotions and raises. This presumption contrasted with the realities at CC, where privil-eges granted at various levels of management were not equal. For example, plant managers considered themselves capable of differentially rewarding subordinates but lacked confidence in the ability of mid/low-level managers to do the same without causing worker unrest. In fact, plant managers believed that it is unwise to encourage subordinate autonomy, and placed limitations on the prerogative of mid/low level managers to conduct the evaluation interviews mandated by EES.
6. *Performance orientation.* CASG personnel presumed that workers should be accountable for their performance and that evaluations and interviews, emphasizing clear performance standards, would motivate better performance. This presumption contrasted with the realities at CC, where it was possible to meet the objective of maintaining the status quo with respect to performance without clearly defined performance expectations or accountability. In fact, this performance orientation at CC conflicted with the EES module of computerized interviews and thereby directly diminished the prospects of a successful EES implementation.
7. *Reward orientation.* CASG personnel presumed that reward should be a direct function of performance. This presumption contrasted with the realities at CC, which was profitable even in the absence of a direct link between pay and performance. Although CC's management was, in principle, oriented toward fair pay, worker compensation was constrained by union contracts which did not link reward directly to performance. In fact, a direct linkage between performance and pay is ordinarily a major motivator in the implementation of EES. Its absence undermined the EES implementation at CC.

Throughout the implementation, people from CC and from CASG were aware that, to a certain extent, there was a gap between the presumed and actual cultures. In particular, personnel managers at CC were perhaps hoping that EES would serve as means toward the aim of achieving a planned cultural change at CC. However, both parties underestimated the magnitude of the cultural gap, and overestimated the ability and will of CC members to move in the direction of the presumed culture.

In summary, the case study demonstrates how growing resistance was a rational response to a gap at four out of the five levels of organizational analysis, i.e. the organizational structure, the distribution of political power, the environment and the organizational culture. The culture gap applies to all the seven dimensions of culture considered important in the literature. In particular, the culture presumed by the CASG team and the actual culture at CC clashed so dramatically, that the time, effort, enthusiasm and experience of CASG staff members were insufficient to prevent failure. Behaviors stemming from the CC organizational culture led to the

consequence (intended or not) of 'resisting' the system. Thus, the system was resisted for reasons that may have been interpreted by CASG employees as 'irrational' given their cultural premises, but which were completely 'rational' from the CC perspective given its cultural context.

6. CONCLUSION AND RECOMMENDATIONS

The analysis in the preceding section began with an application of the Markus and Robey framework. It ended with tracing the failure of EES implementation to a multitude of discrepancies between the presumed and actual organizational cultures. Our analysis points to the culture-system level of analysis as complementing the four levels of analysis suggested by Markus and Robey, i.e. user-system, structure-system, power-system and environment-system levels of analysis [34]. In this specific case, problems along three of the original four levels of analysis, together with the problems along the dimensions of organizational culture, developed into an MIS failure. Although our analysis treated each level of analysis individually, we are aware that there may also have been some interactions among these levels which, in addition to major problems at the individual levels, further complicated the implementation.

The probability of failure, the extent of failure and the time taken to diagnose failure vary among implementation projects. The magnitude of damages from failure in the case study under review grew significantly with time. It may well be that the failure of EES was inevitable because of a predisposition to failure at most levels of analysis. However, the cost of failure in this case was particularly high and the time to diagnosing it was unusually long due to the clash between the presumed and actual culture along most the cultural dimensions. In other words, the number and scope of issues that were problematic in this case created a 'veil of ignorance' which prevented the people involved in the project from early recognition of the reality as it was, i.e. that the project was doomed to fail. We believe that had there been an earlier diagnosis of the culture clash in this case, many of the adverse consequences associated with the final termination of the project could have been avoided.

The inclusion of culture in analysis of MIS implementation leads to two recommendations for practitioners. First, simply to be aware of culture. System designers should be aware that the intended system users may attach their own meaning to the MIS, independent of the content and the intentions built into the system design. They should regard users almost as if they were members of another ethnic group with its own culture. System designers should also be aware that their own understanding of the MIS in question is necessarily 'culture bound'. Likewise, system users should be aware that system designers (especially vendors of pre-developed software packages) may presume an organiza-

tional culture dissimilar to the one underlying the user organization.

The second recommendation for practitioners is, once they are sensitive to the presence of culture, to regard it as a binding constraint in MIS implementation. Cultures are not built overnight, nor can they be changed overnight. Cultures, in the short run, are 'constant'. Therefore, an MIS must be designed and adjusted to fit the organizational culture. To do otherwise (i.e. to adjust the organizational culture to fit the MIS) would be an instance of using the tail to wag the dog. Moreover, if despite this recommendation, management wishes to harness an MIS as means toward a planned cultural change, awareness of culture is not enough. Before and throughout the implementation the magnitude of cultural change must be assessed and monitored to insure that it is not grounds for resistance.

The present analysis also suggests several directions for future research. Some of the questions that may be pursued are: Is one of the five levels of analysis more dominant than the others in causing MIS failure? Are there additional levels of analysis that may predict or explain MIS implementation prospects? Initial answers can be acquired through additional research using case studies [25, 26].

There is also room for further research on the role of organizational culture in MIS implementation. For example, Weber [59] found that some dimensions of culture, such as reward and performance orientation, better explain the variability of conflict in mergers and acquisitions than other dimensions. Similarly, it is worth investigating whether some dimensions of culture are more relevant to MIS implementation than others and whether the importance of culture is contingent upon specific characteristics of the implemented MIS.

Markus and Robey [34] emphasize that the four levels of analysis are not mutually exclusive and that complex interactions among them are also relevant to implementation prospects. More research into these complex interactions is needed. In particular, it is worthwhile to check into the possibility that the time it takes to diagnose a project failure might be directly related to the complexity of these interactions simply because complex interactions among the levels of analysis may cloud the picture and obstruct early detection of resistance.

In further research concerning early detection of MIS failure, it is important to sort out which instruments among those that have been developed in the fields of anthropology, sociology, psychology and management suit pre-implementation analysis. Even after the right tools are identified, it is reasonable to assume that analysis of the prospects for an implementation failure in general, and the probability of culture clash in particular, can require a major effort. Pursuing such an analysis prior to each and every MIS project would be hard to justify economically; therefore, it is important that future research deals with design and development of dis-

crimination models to guide practitioners regarding the question: under what circumstances is a pre-implementation analysis at the five levels worth the effort and what is the degree of effort that would be justified? Because justification for pre-implementation analysis would depend on the underlying risk and cost of failure, the required models should focus on assessment of risk and cost factors underlying a prospective implementation project. Some projects may require more diagnostic effort while others (e.g. more predictable and less culture bound) may not. Some preliminary work on MIS implementation circumstances that justify a cultural analysis was conducted by Romm et al. [49].

Finally, there is a need for additional and more comprehensive research that would pursue the interpretive approach in studying the role of culture in MIS implementation, particularly Soft Systems Methodology [7, 8, 11]. This promising methodology is sensitive to complex dimensions of organizations such as culture. At the same time it is highly structured and goal oriented. These attributes make it potentially suitable for further study of culture in the context of MIS implementation.

In summary, past research on MIS implementation addressed the challenge of successful implementations by providing guidelines on analysis along the user-system, structure-system, power-system and environment-system levels of analysis. We believe that practice and research in the future should also address the culture-system level of analysis, with particular emphasis on early detection of a gap between the culture presumed by the MIS design and the actual organizational culture.

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