

Toward A Methodology For Managing Information Systems Implementation: A Social Constructivist Perspective

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Abstract

This paper argues that our approach to managing the implementation of information technologies is often dependent on how we frame the implementation problem. The paper first traces the dominant ways of framing the implementation problem that are evident in the literature, and through this historical analysis, identifies the Leavitt's diamond for representing organizations as the integrative conceptual model underlying much of the current implementation literature. Next, by drawing on the notions of objective and subjective realities from the arena of sociology of knowledge, the paper further develops the diamond model and uses it as a frame for informing the implementation of code-generators in a hypothetical organization. The richer understanding enabled by the enhanced diamond model proposed in the paper leads to the formulation of some broad guidelines for managing the implementation of "interpretively flexible" information technologies. These guidelines are summarized in four steps: 1) self-understanding through self-reflection, 2) identification and understanding of all important stakeholder groups, 3) identification of stakeholders who are likely to resist, and 4) modifying the objective or subjective realities as appropriate.

Keywords: Information systems, implementation, stakeholders' world-views, social construction, code generators, hypothetical case study.

Introduction And Review of the Implementation Literature

Implementation of information systems has been a topic of considerable interest to practitioners as well as academic researchers for over two decades. In a broad sense, implementation refers to *all that must be done by a specific organization for it to be able to harness the capabilities of a particular information technology as envisioned*. A number of prominent operations research/management science (OR/MS) and information systems (IS) researchers have recognized that behavioral issues rather than technological issues seem to be at the root of problems related to implementation (Schultz and Slevin, 1975; Ginzberg, 1978; Lyytinen and Hirschheim, 1987; etc.). Consequently, much of the research on implementation in the fields of OR/MS and IS has focused on the related human aspects.

Different scholars have tried to address the problem of im-

plementation in different ways, thus deriving different insights and prescriptions for successful implementation. Among the first to analyze implementation were Churchman and Schainblatt (1965), who viewed implementation as "the problem of determining what activities of the scientist and the manager are most appropriate to bring about an effective relationship between the two". They recommended a relationship of "mutual understanding" between that scientist (i.e., the IS professional) and the manager (i.e., the user) wherein each would come to understand the other through a dialectical process (see Figure 1a). While Churchman and Schainblatt's approach was a novel and useful way of framing implementation, it had at least three serious limitations: first, the approach completely ignored the system (technology) that was to be implemented; second, it provided almost no guidance on how to achieve the state of mutual understanding; and third, the approach did not incorporate the fact that "scientists" and "managers" do not (and cannot) operate isolated from the context of implementation.

The next wave of research (Lucas, 1975; Schultz, Ginzberg and Lucas, 1984; DeSanctis, 1984; Leonard-Barton, 1988) thus focused on identifying a broad range of factors that affect implementation outcome (see Figure 1b). Factors identified are classified as:

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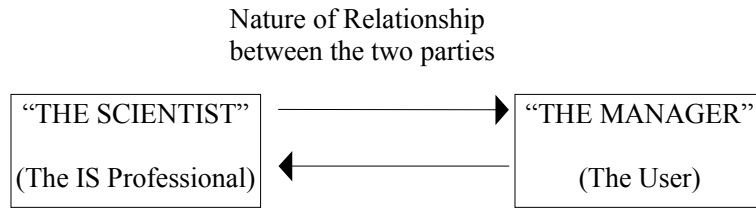


Figure 1a: Philosophical View

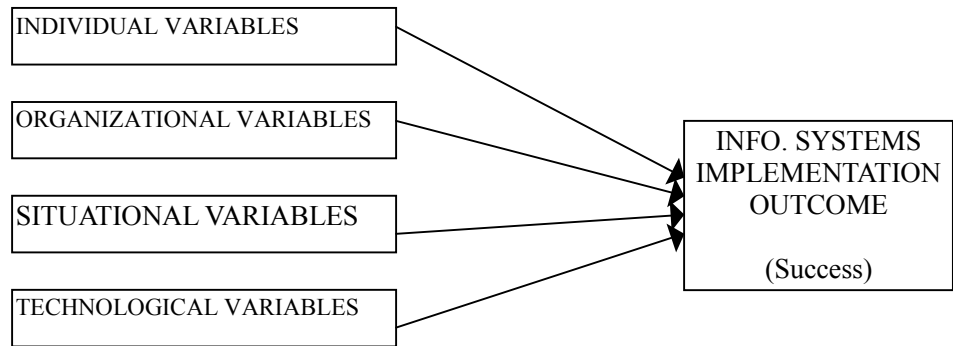


Figure 1b: Factor View

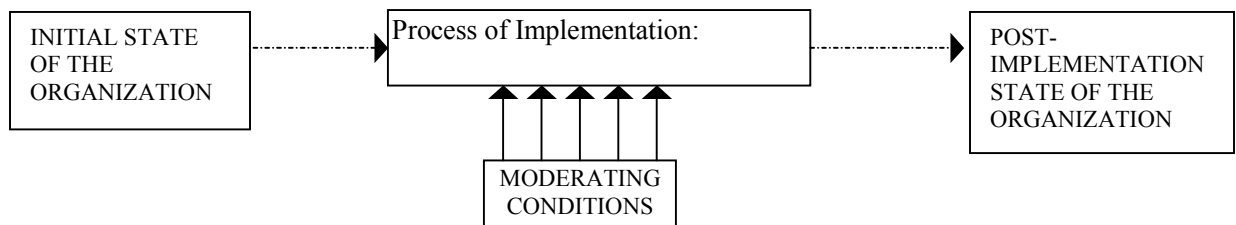


Figure 1c: Process View

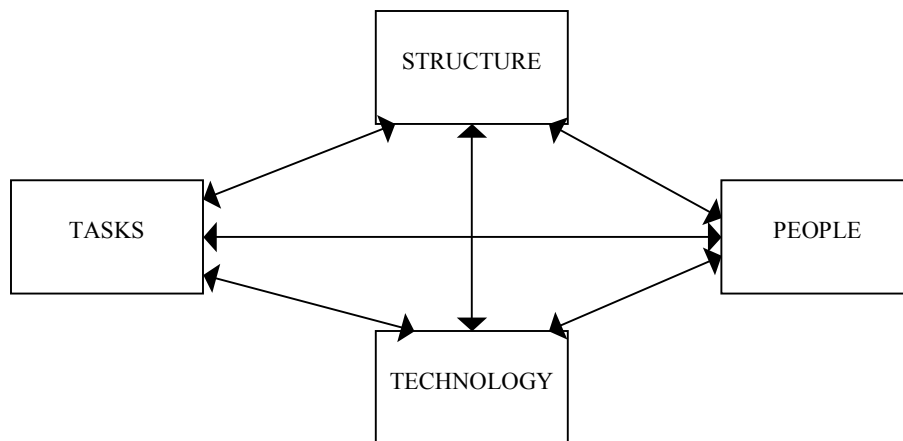


Figure 1d: Socio-technical View

Figure 1: DIFFERENT WAYS OF FRAMING IMPLEMENTATION

- *individual variables* such as needs, cognitive style, personality, demographics, decision-style, and expectancy contributions;
- *organizational variables* such as differentiation/ integration, extent of centralization, autonomy of unit, culture, group norms, reward systems, and power distributions;
- *situational variables* such as user involvement, nature of analyst-user communication, organizational validity, and the existence of critical mass; and
- *technological variables* which include *the type of technology* (MIS, TPS, CASE tools, EMS, etc.), and *characteristics of technology* such as transferability, implementation complexity, divisibility, and cultural content.

As scholars started understanding the role of different factors, they came to the realization that implementation was not a static phenomenon as implicitly assumed by those conducting *factors research*, and that implementation would be better understood as a *process* mediated by certain conditions such as project management, presence of a champion and top management support (see Figure 1c). While some scholars adopting the “process view” saw implementation as diffusion of innovation, most viewed it as a process of changing the institutionalized way of doing things within an organization (Ginzberg, 1978; Galbraith, 1979), and thus, existing process models of organization change (e.g. Lewin/Schein model, Kolb/Frohman model) were often used to conceptualize the implementation of information systems.

The process view of implementation was further developed by scholars influenced by the “socio-technical” school of thought (e.g., Bostrom and Heinen, 1977; Markus, 1983; Robey, 1987), and this “interactionist” approach arguably remains the dominant one for the study of implementation of IS in organizations (see Figure 1d). Within this perspective, the organization is implicitly conceptualized as a “diamond,” a model originally proposed by Leavitt (1965), consisting of interacting components: people, tasks, technology, and structure. Introduction of an IS involves changing the organization’s technology component which automatically triggers changes in the other components of the organization.

Implementation essentially refers to anticipating and strategically managing the impacts of the change of the technology component (Robey, 1987) such that the IS becomes “organizationally valid” (Schultz and Slevin, 1975; Markus and Robey, 1983) as the organization comes to a post-implementation steady-state. Scholars usually focus on one or more edges of the diamond at a time and recommend organizational impact management strategies such as job/task redesign (Slocum and Sims, 1980), retooling the “people component” through resistance management strategies such as training or education (Bronsema and Keen, 1983), or changing the structure through redesign of the incentive and accountability systems (Nichols, 1981; Orlikowski, 1992).

Clearly, the perspectives discussed above represent considerable progress made by researchers in the area. Unfortunately, the diamond model, which appears to be the foundation for much of the current understanding of IS implementation, fails to reflect sufficiently the political underpinnings of implementation (Keen, 1981; Markus, 1983) and institutional realities such as symbols (Hirschheim and Newman, 1991) and frames (Orlikowski, 1992). It is argued in this paper that such issues cannot be satisfactorily addressed without taking into consideration the “subjective realities” that exist in the minds of the actors.

Also, given the recognition of the importance of conceptual devices and frameworks in informing management practice (Astley and Zammuto, 1992), and more specifically, of an organizational model in informing implementation management (Bostrom and Heinen, 1977), it is surprising that scholars have not attempted to improve or extend the diamond model by incorporating concepts (such as subjective realities) that can help analyze political or institutional issues.

This paper, thus, attempts to enrich the existing organizational model based on insights from Berger and Luckmann's work (1966) in the arena of sociology of knowledge, and through the application of this enriched model, hopes to contribute to the stream of socio-technical literature on IS implementation.

The basic thesis of the paper is that *prior conceptualizations of organizations have recognized only "objective realities" which has led to an incomplete understanding of implementation; by including the analysis of "subjective realities" in the organization, a better understanding of political and institutional forces and of organizational resistance arising from them may be gained.*

The following section (Section 2) develops the organizational model. Thereafter, in Section 3, the model is illustrated using a hypothetical case of code generator implementation. Section 4 presents guidelines for implementation management derived using the proposed model. The final section (Section 5) concludes with the limitations of the proposed model and future research directions.

Reconceptualizing Organizations

Leavitt's “diamond model” of organizations has gained significant acceptance in organization theory (Scott, 1992) as well as in information systems (Bostrom and Heinen, 1977; Keen, 1981). As mentioned in the previous section, this model depicts organizations as comprising of four interacting components: *task, technology, people and structure*. This model provides the foundation for the re-conceptualization of organizations presented in this paper.

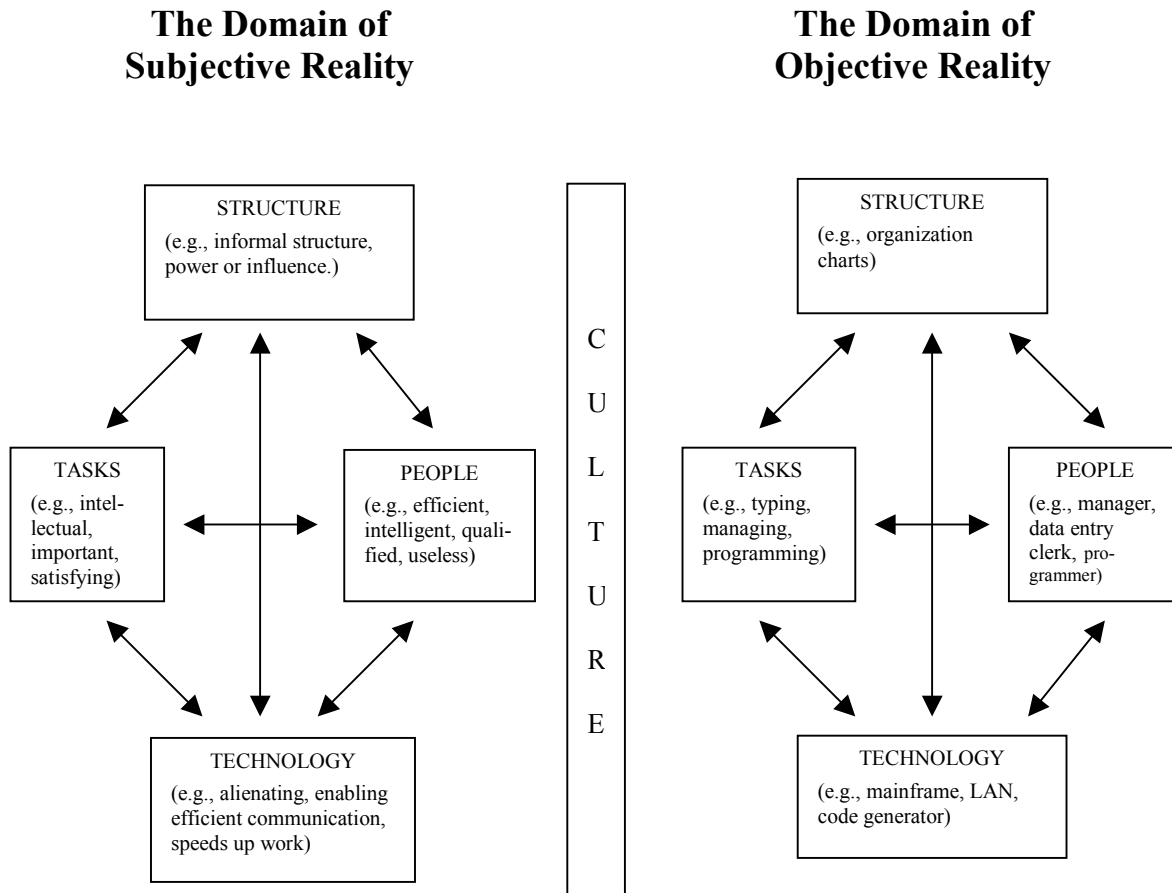


Figure 2a: THE PROPOSED ORGANIZATIONAL MODEL

Another fundamental source of ideas for the model proposed is the vigorous ontological debate between the functionalist and interpretive scholars about the "reality" of organizations (Burrell and Morgan, 1979; Orlikowski and Baroudi, 1991). While functionalist scholars see every aspect of organizations as objective reality, the interpretive scholars embrace the assumption of nominalism, maintaining that reality is "socially constructed." The model presented (Figure 2a) is based on the position (derived from the work of Berger and Luckmann, 1966) that organizations are entirely socially constructed, with some aspects seen as "*objectively real*" and others as "*subjectively real*".

According to Berger and Luckmann (1966, p. 54), "institutionalization occurs whenever there is a reciprocal typification of habitualized action". Over time, these humanly produced institutions, resulting from the reification of patterns of acting and interacting in recurrent situations, are experienced as taken-for-granted *objective realities*, that are external to but persistently confronting an individual, *similar* to the realities of the natural world (Ritzer, 1992). In an organization, all institutionalized entities: tasks (such as managing, programming, and accounting), structures (such as bureaucratic hier-

archies and reward systems), technologies (such as computer technology and well-defined organizational procedures), and individuals (who are believed to be partly "formed" through the definition of others (Meltzer, 1993)) are experienced as objective realities by organizational members in their everyday life.

Subjective reality refers to the reality "as apprehended in the individual consciousness rather than on reality as institutionally defined" (Berger and Luckmann, 1966, p. 147). Subjective reality is of utmost importance in organizational analysis because self-determined human action is believed to follow a stage of examination and deliberation of this reality (Thomas, 1993). It must be emphasized here that the word "subjective" does not *pejoratively* intend to convey the idea of being *arbitrary* or *opinionated* but instead refers to *the meaning held by the human subjects* of the world they experience around them (Lee, 1991).

Members of the complex modern society (and organizations) play specialized roles, and are thus required to acquire role-specific knowledge through secondary socialization. Roles mediate between "the macroscopic universes of meaning ob-

jectivated in a society and the ways in which these universes are subjectively real to individuals” Berger and Luckmann, 1966, p. 79). In other words, the role specific knowledge acts as a lens through which a socialized individual subjectively experiences the world that is taken-for-granted as objective in the larger society. An individual’s socialization into a particular role is often differentiated by geographical, organizational or occupational factors, and this involves the "internalization of (differential) semantic fields structuring routine interpretations and conduct within an institutional area" (p. 138). Consequently, individuals socialized into different occupations and roles, and belonging to different cultural and interest groups tend to experience the *same* “objective reality” as *different* “subjective realities”.

The Proposed Model

The two realities discussed above form the basis of the two domains of the organization: *the domain of objective reality and the domain of subjective reality* (see Figure 2a). *Organizational culture* occupies a pivotal position in the model proposed, mediating between the domains of objective and subjective reality. Culture (including sub-cultures) may be seen as a socially constructed objective reality that provides organiza-

tional members with ideas and beliefs, value orientations and significations through which situations are interpreted (Blumer, 1993), and it is through the medium of culture that a common sense of social reality is experienced subjectively, articulated, objectified, and reproduced (Berger and Luckmann, 1966; Coombs, Knights and Wilmott, 1992; Powell and DiMaggio, 1991).

Based on the previous discussion of the different building blocks of the organizational model, it is not difficult to see that corresponding to each organizational component in the domain of objective reality, there exists a subjectively real component that an organizational member sees as a superimposition of images through at least two *lenses that continuously interact* with each other: the first lens depends on the roles and responsibilities of the member in the organization, and the nature of role-specific knowledge acquired by the member through/during secondary socialization; and the second lens is provided by the organizational sub-culture to which the member belongs. It is important to note that the first lens (referred to as “frame”) is a cognitive structure or a mental model that is held by individuals and sometimes shared among them. In contrast, the second lens (the “sub-culture”) refers to the objectified product of historical action

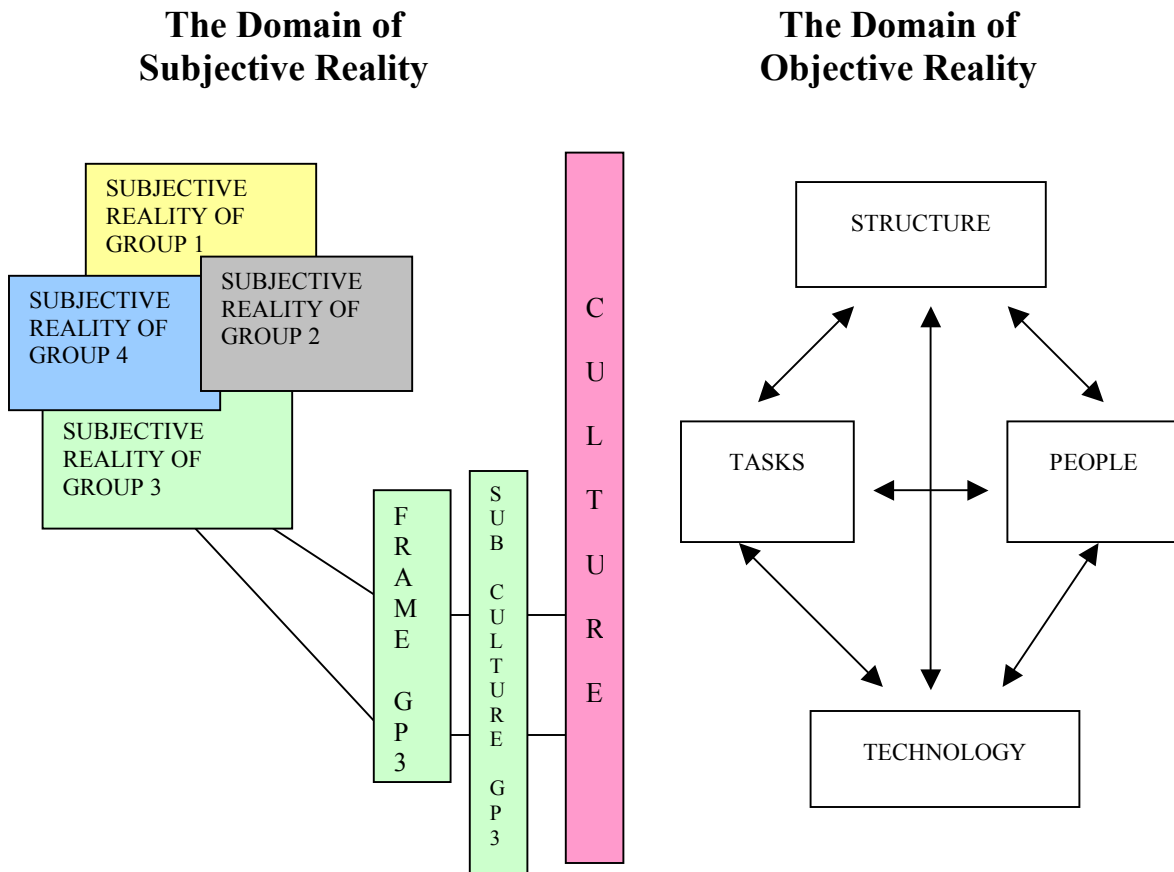


Figure 2b: THE PROPOSED ORGANIZATIONAL MODEL: ANOTHER VIEW (WITH FOUR STAKEHOLDER GROUPS)

(by the relevant group) that has assumed a life of its own independent of the current members of the relevant group (Orlikowski and Gash, 1994).

Since several organizational members go through similar secondary socialization, occupy positions with similar roles and responsibilities, and encounter similar sub-cultures, it is likely that they will experience similar subjective realities for a given objective reality. It follows that other members who differ significantly with respect to secondary socialization or sub-cultures or assigned roles and responsibilities are expected to experience dissimilar subjective realities for a given objective reality (see Figure 2b). If we adopt the Parsonsian view that organizational members act so as to maximize their utilities (Powell and DiMaggio, 1991) as defined by their organizational roles, subcultures and socialization experiences, and that their actions follow an examination and evaluation of their subjective realities (Thomas, 1993), it is clear that a negative evaluation may result in the concerned organizational members mentally rejecting an existing (or a projected) state of objective reality. The same analysis would apply if we assume utility satisficing rather than utility maximizing behavior of organizational members. This rejection of the *target/projected* post-implementation state of objective reality is manifested in attitudes or actions that are often recognized as *resistance* to implementation (Hirschheim and Newman, 1988).

A Hypothetical Case Study

The previously described notions of objective and subjective realities in organizations may be briefly illustrated through the following *hypothetical* example. While some simplifying assumptions in the hypothetical case study (e.g., data-entry operators report to programmers) may seem somewhat artificial/unrealistic, the central issues highlighted in the case are fairly representative of “real” IT implementation, and, in fact, similar concerns regarding CASE tools have been documented in the literature (e.g., Orlikowski, 1989). The device of a hypothetical example is deliberately utilized to illustrate the model and develop a management approach, since it is likely that any real case would introduce additional organizational peculiarities/complexities that would unnecessarily distract the reader away from the model being illustrated.

The domain of objective reality

The setting is that of an Information Systems Development and Processing company with primarily three groups of employees: **data-entry operators** who *report* to the **programmers**, who, in turn, *report* to the **management**. The (presumed) goal of all three groups of employees is to ensure the success of the company (say, by maximizing productivity and thus, profitability).

The managers and programmers have college degrees, and many of them hold graduate qualifications. The data-entry operators, on the other hand, are high-school graduates with some vocational and on-the-job training. The managers are involved in the management of the company’s resources, including the human resources (i.e., programmers and data-entry operators). Programmers are involved in the development and maintenance of information systems written primarily in COBOL, CICS, and IMS. The data-entry operators are involved in data-entry and other clerical activities.

Within this context, assume that the management has decided to implement a sophisticated “code generator” in the organization. Code generators have been defined as “special-purpose computing tools that have been developed to generate reasonably good code from specifications, saving an organization time and money” (Hoffer, George and Valacich, 1996, p. 17). Code-generators, such as the one selected for implementation in this organization, have been recognized in the overall IT industry (in trade journals, by noted speakers in IS Management conferences, etc.) as the “state-of-the-art” software technology that has tremendous potential to enhance the productivity of software development companies, which, in most instances, are significantly understaffed, and thus, unable to meet committed deadlines. This view is what we may think of as the “objective view” regarding code generators.

The domain of subjective reality

In this hypothetical case, there are three relevant social groups who see the “objective reality” described above through three distinct sets of frames and sub-cultures. The managers, who see themselves as the professional guardians of the company’s economical well being, view the code-generator technology as a productivity tool, as touted in the management press and by prominent speakers in conferences. In their view, such a tool will make the programmers more productive and economically valuable, and thus, help upgrade their status in the organization. They, therefore, see no rational reasons for programmers to resist the implementation. Based on their limited understanding of the code-generators, the managers are quite certain that the implementation will not have any impact on the data-entry operators and do not even perceive the possibility of resistance from them. Interestingly, the managers find themselves very enthusiastically pursuing the implementation not only because of the potential programmer productivity enhancements, but also because the code-generator technology symbolizes their own professionalism and their vision to invest in the latest technologies for future well-being of the company.

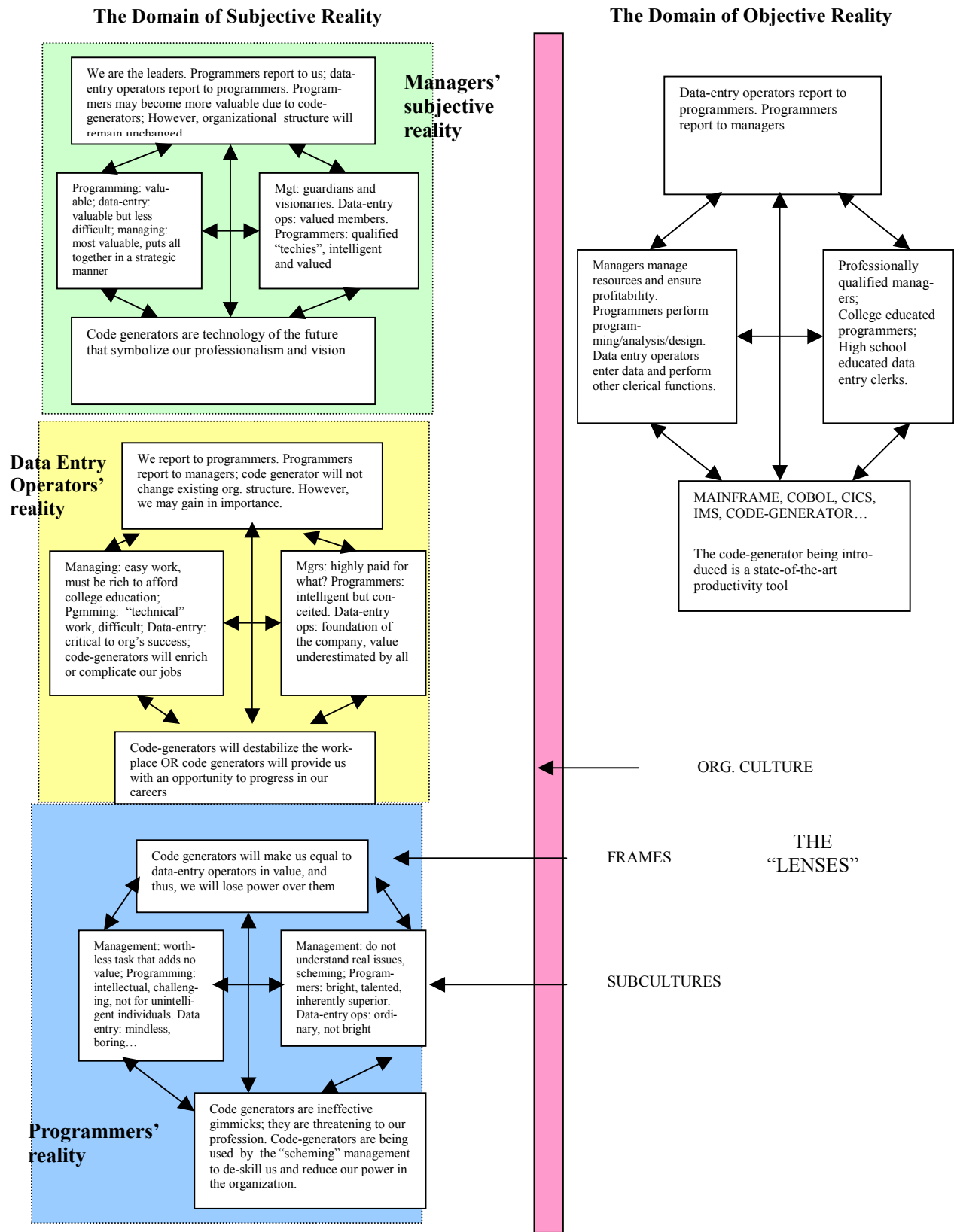


Figure 3: APPLYING THE PROPOSED ORGANIZATIONAL MODEL TO A HYPOTHETICAL CASE OF CODE-GENERATOR IMPLEMENTATION

The programmers, on the other hand, see a completely different image of the objective reality. They view the technology as "threatening" to change their task from "intellectual" programming to "mindless" specifications or data entry, which even the "lowly" data-entry operators could undertake with

little training. Their subjective reality, in sharp contrast to that of the managers, equates code-generator implementation as "deskilling" their "technical" tasks, resulting in a loss of their importance and power in the organization and contributing to a negative impact on "their conception of self." Within this reality, the programmers see management as their enemy deliberately scheming to undermine their (the programmers') position in the organization. Clearly, resisting implementation appears absolutely rational from the point of view of the programmers.

Finally, the data-entry operators are divided in their views, depending on whether they value stability more than they value the opportunity to advance by learning to use new technologies. Those valuing stability (and no change in their environment) would resist the implementation of code-generator while those with a curiosity about technologies would invite the implementation (see Figure 3). It may be noted that either group of data-entry operators may not be even aware of issues that are of concern to the programmers (power, deskilling) and the managers (profitability, professionalism) just as the programmers and managers may not be aware of the data-entry operators' concerns regarding the code-generators.

In this context, how can an implementation manager, who is entrapped in her own subjective view, effectively approach the implementation of the code-generator? (The hypothetical scenario is especially relevant to the implementation of technologies that have a high degree of "interpretive flexibility" (Orlikowski, 1992b)). Such technologies are "appropriated in diverse ways and come to have different meanings and effects for different users" (p. 408). The next section provides an outline of the proposed approach.

Implications For Managing Implementation

Implementation involves the smooth integration of an information system in an organization. A number of guidelines for implementation planning emerge *merely by framing implementation within the context of the organizational model* previously described (see Figure 4):

1. The **first step** for an implementation manager is *to understand herself*. She must appreciate that her view of the organization is shaped by her "lens" derived from her position in the organization, its (sub)culture as well as her previous socialization experiences, and *that her view may or may not be shared* by other (groups of) members in the

organization. Through a process of *self-reflection*, she must attempt to unstack her assumptions, biases, and self-interests that are embedded in her "lenses" and to discover *why* she experiences her "subjective reality" the way she does - especially with respect to issues such as the current state in the organization, the technology that must be introduced, desired modifications in the "domain of objective reality" of the organization, and the state of the organization after implementation is complete.

2. The **second step** is *to identify and understand all the important stakeholders of the technology to be implemented*. Stakeholders may be individuals or groups who have any interest in the system or are likely to experience an impact due to the implementation of the system. A heuristic for determining the order of importance of the stakeholders is their relative power in the organization. Understanding stakeholders requires the implementation manager to be nothing less than an *organizational ethnographer* whose goal is to obtain a hermeneutic reconstruction of the "lenses" through which stakeholders see their images. Agar (1986), Geertz (1983), Van Maanen (1988), and Harvey (1997), among others, provide detailed discussions on ethnographic techniques and experiences.
3. The implementation manager is advised to proceed with the assumption that stakeholders know what they are doing, which is a fundamental premise in hermeneutic understanding (Lee, 1991). In other words, the manager must suspend any negative or stereotypical beliefs about the stakeholders and firmly uphold the assumption that the stakeholders, like most other human beings, act rationally according to their *own* utilities (Powell and Dimaggio, 1991). Thus, what might initially appear irrational to the implementation manager may indeed be rational from the point of views of certain stakeholders.

The **third** step involves the *identification of stakeholders* whose "subjective realities" are such that their evaluations of the realities are likely to indicate that they are "losing out." This negative evaluation is likely to provide the stakeholders with an incentive to resist the changes (Beer, 1988).

4. Two conceptually separable strategies (for "reality negotiation") are available to the implementation manager at this stage. The **first** is *to modify one or more organizational components in the domain of objective reality* such that the implementation goals are achieved from the manager's point of view and there are neither significant "reality gaps" nor perceptions by any group of its members "losing out." Through an iterative process, a manager may attempt to reach this type of solution. The **other** approach is *to make changes to the "lenses" that the stakeholders use to experience reality*. This calls for resocialization of

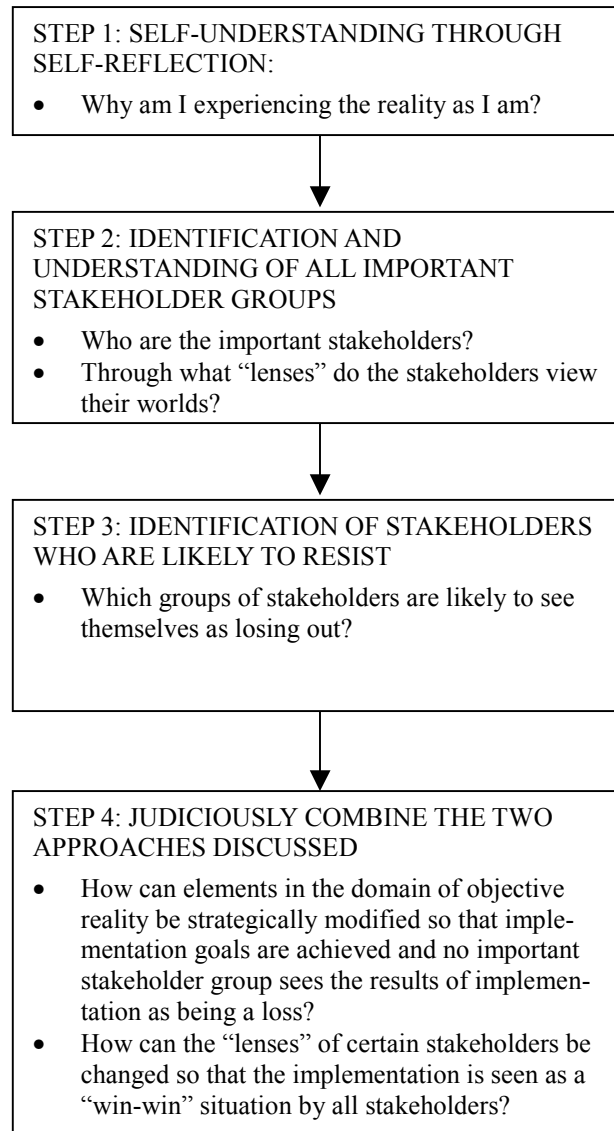


Figure 4: PROPOSED GUIDELINES (AND QUESTIONS) FOR IMPLEMENTATION MANAGERS

the group to new symbolic media, values, and roles that get enacted, objectified and, over time, incorporated into the group's "lenses." Such resocialization may be attempted through indoctrination conducted in long-term educational and training programs, rewarding certain behaviors and symbolisms (use of certain vocabulary), "stakeholder-involvement" in early phases of implementation planning (which would also enable the manager to develop a better understanding of the stakeholders), and top management involvement for legitimization of certain beliefs, values, and symbols. However, it must be recognized that "the already internalized reality has a tendency to persist. Whatever new contents are now to be internalized must somehow be superimposed upon this already present reality.... The

present reality.... The problem may be more or less difficult of solution in different cases" (Berger and Luckmann, 1966, p. 140). Another difficulty is that internalization of symbolic media, values, and roles often takes more time than what an organization may have available.

The **fourth step** in implementation *involves combining the two approaches described above*. Sometimes it is impossible to implement a system without having at least one group of dissatisfied stakeholders (Markus, 1983; Davenport, 1993). Under such circumstances, the manager could choose "to offend" the least powerful stakeholders and may attempt to forcibly "define reality," disband or reorganize groups that are likely to resist, or pro-

actively protect the organization from any strategic moves of resistance made by the relevant group of stakeholders. Sometimes, based on the analysis of the sub-cultures, frames, and subjective realities of different stakeholders, the manager may even find it prudent not to implement a particular technology.

Conclusion

The proposed organization model based on Leavitt's "diamond model" and Berger and Luckmann's notion of "the social construction of reality" represents a preliminary effort toward a richer and more integrative comprehension of IS implementation. In attempting to create a richer and integrative understanding of implementation, the paper makes at least three important contributions:

- It draws on well-respected sociological tradition to further develop the organizational model that appears to underlie much of the implementation literature;
- It integrates multiple levels of analysis (individual, group, organizational levels) and demonstrates the importance of considering the dual nature of reality for the purpose of analyzing information technology implementation in organizations;
- It attempts to make "scholarly" concepts such as social construction of reality, objective and subjective realities, self-reflection, hermeneutics, ethnography, and frames accessible to practitioners involved in the management of implementation.

However, like most other papers, this paper too makes assumptions that may be questioned. The proposed approach takes for granted: first, the utility maximization behavior of shareholders that has been criticized in the literature; and second, the mastery of IS implementation managers over the disciplined practice of self-reflection, hermeneutics or other ethnographic techniques. (This paper refers to utility maximization in this context as involving bounded rationality since the utility itself is not based on a rational process but is a result of the individual's position and interests in the organization, the individual's group's subculture, the individual's secondary socialization as well as the organizational culture.) It may be argued that the first assumption of "bounded rationality" is indeed a realistic approximation of how organizational actors decide on their course of action; and the second assumption may be satisfied if organizations realize how important these interpretive capabilities are in implementation, and select implementation managers accordingly. The validity of the second assumption has enormous implications for academic programs in the area of IS Management. The potential importance of interpretive capabilities for implementation managers suggests that providing IS students with *propositional knowledge* (Astley and Zammuto, 1992) regarding the implementation process or of factors that affect it will no longer be suffi-

cient. Educational programs will, in addition, have to impart *conceptual* and *symbolic* knowledge (Astley and Zammuto, 1992) through the use of well-designed socialization processes to develop necessary conceptual, self-reflective, interpretive abilities and a sense of ethical responsibilities in students.

The organizational model proposed in this paper may also be criticized for being biased towards "subjectivity". While such criticism may be valid, it may be argued that the bias (inherited from the phenomenological approach of Berger and Luckmann (1966) is actually useful in countering the overly objectivist orientation in the arenas of IS management scholarship and practice today. Future research on further enhancing the proposed model may be directed to integrating the role of social structures in the model (Ritzer, 1992), and further clarifying the concepts of culture, sub-culture and frames in the context of the proposed organizational model.

Finally, the paper may be criticized for not providing empirical illustration or validation of the model/guidelines. Such a criticism is valid not only for this paper but also for every other conceptual paper. The hypothetical case presented in this paper was created to partially address this concern in that it attempts to provide the reader with a plausible and illustrative scenario in which the proposed approach may be applied. Future research may involve designing laboratory experiments that test hypotheses regarding the effectiveness of the approach in "simulated" IS implementation projects in academic settings, or conducting action-research/ deductive case studies on "live" implementation projects in organizations in order to evaluate the approach proposed in this paper.

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