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# AN EXPLORATORY STUDY OF JOINT APPLICATION DESIGN (JAD) IN INFORMATION SYSTEMS DELIVERY

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## ABSTRACT

Joint Application Design (JAD) methods are used in information systems delivery for tasks such as gathering business requirements for systems development projects. Although these methods are popular and their use is widely advocated, there have been no systematic empirical evaluations of their use and potential organizational outcomes. This paper reports on an exploratory field study into the adoption and use of JAD methods at three research sites. Data collected at these sites suggest that JAD participants commonly modified espoused JAD methods in ways that reinforced the status-quo ISD process, thus limiting the potential for realizing substantial benefits typically ascribed to JAD methods. Two theoretical approaches to analysis of these data and to further study of JAD use are considered. These approaches, institutional theory and mutual adaptation theory, are discussed within the structuration framework outlined by Orlikowski and Robey (1991). Implications for management of ISD process changes such as adoption of JAD methods are considered.

## 1. INTRODUCTION AND OVERVIEW

In 1977, IBM developed a method for determining information system requirements based on facilitated group workshop techniques known as Joint Application Design (Wood and Silver 1989). Today, there exist a variety of proprietary JAD-like methods<sup>1</sup> and customized JAD-like methods developed by information systems delivery (ISD) organizations in-house. In this paper, **Joint Application Design (JAD)** is the term used to describe any of the variety of related methods<sup>2</sup> which share these characteristics:<sup>3</sup>

- Users with relevant business knowledge work together in a workshop to accomplish tasks such as defining business requirements for an IS development project.
- Participants in JAD workshops fulfill prescribed "roles": Executive Sponsor, Business Participants (users), IS Analyst/Project Manager, Scribe, Session Leader, Observers. Business participants are the focus of the workshops. The IS analyst or IS observers attend to provide technical information when necessary.
- Workshops are conducted in an intensive schedule of consecutive, all-day (or half-day) sessions, ideally in an off-site location.

- Workshop sessions are highly structured, with rules of conduct, objectives, a detailed agenda, and predefined documentation forms.
- The session leader/facilitator, trained in group dynamics and meeting facilitation techniques, leads the group through various tasks and analytical exercises.

JAD workshops are typically used for project definition, requirements definition, or user interface design tasks but may be used in a variety of IS development activities in which group problem solving and decision making are required or valuable.

Many ISD organizations have adopted a JAD method in the hopes of improving their information systems delivery process. Although IS managers, JAD facilitators, and consultants have reported improvements in system quality, IS productivity,<sup>4</sup> development time, and user commitment to the system resulting from JAD use (Aiosa 1989; Andrews 1991; Bradley 1989; Corbin 1991; Duncan 1990; Flaaten et al. 1989; Kerr 1989; Kettelhut 1993; Keyes 1989; LaBoda 1987; Leavitt 1987; Rush 1985; Wood and Silver 1989), evidence to support these claims is largely impressionistic, based on informal feedback from practitioners and vendors. No systematic research has been published to assess how organizations are applying JAD methods in

practice, what consequences result from such use, or whether benefits commonly attributed to JAD use are realized (Carmel, Whitaker and George 1992).

Given the lack of empirical data and theoretical assessment of JAD methods in ISD, the goals of this research were, first, to study several organizations using JAD methods, to understand how these organizations have incorporated and are using JAD in their ISD process; second, to understand the ISD outcomes of such usage; and third, to consider theoretical interpretations of this data that could inform future research on JAD adoption and use. The following section describes the methodology used to collect data for this study. Section 3 presents the empirical data on JAD use at three research sites and discusses the implications of such use on the ISD processes at these sites. Section 4 then considers two theoretical approaches to interpretation of this data: institutional theory and mutual adaptation theory. These theories are considered within the structural framework outlined by Orlikowski and Robey. The final section addresses implications for research and practice.

## 2. RESEARCH METHODOLOGY

Field research was conducted during the first six months of 1992 and consisted primarily of semi-structured interviews at three research sites (Alpha, Beta, and Gamma). Each research site is a medium to large sized financial services company in the Northeast, with 4,000 to 8,000 employees in the headquarters offices. The IS organizations within each are similarly structured, with a corporate IS group running the data center and network and providing technological and methodological expertise. IS developers are assigned to business units and, at Gamma and Beta, report directly to these units. All three sites have adopted a variety of ISD process changes in the last five to eight years, such as Information Engineering (IE), Computer Assisted Software Engineering (CASE) tools, and data modeling and process analysis techniques.

Interviews averaged about an hour in length and were conducted with a variety of JAD workshop participants (See Table 1). Informants were asked to describe, in detail, their experiences with JAD workshops on one or more projects. Of the sixteen projects discussed, twelve concerned transactional systems, two were decision support systems, and two were a mixture of transactional and decision support systems. One to four informants were interviewed for each project. In all cases, the JAD workshops had been completed, from two months to several years earlier. Informants who were involved with the adoption and implementation of JAD techniques in their organizations were also asked to describe that process.

In addition to interview data, observational data were collected during two days of a JAD workshop conducted at Gamma and during six day-long meetings of JAD facilitators' round-table groups. Members of these groups are primarily facilitators and independent consultants working with various New England organizations. At these sessions, members shared their own and their organizations' experiences with JAD methods.

## 3. RESEARCH STUDY FINDINGS

Section 3.1 describes the process by which each of the research sites incorporated JAD methods into their ISD process. Section 3.2 discusses ways in which these organizations modified espoused JAD methods *in practice*. Section 3.3 discusses the implication of such usage of JAD methods on desirable outcomes, such as shortened system delivery time, user understanding and commitment to the system, and so on.

### 3.1 Incorporation of JAD Methods at the Research Sites

At Alpha, senior managers in IS and corporate training introduced JAD methods as part of a major initiative in the late 1980s to improve the ISD process. In addition to JAD, they adopted Information Engineering (IE) as the new systems development methodology and purchased a CASE tool. They also created a corporate group of methodology consultants to promote use of these new techniques and methods. JAD methods were used in several large, visible projects during the next three to four years. An in-house training program was developed and over thirty people in the IS department were trained in workshop facilitation techniques. Facilitators began meeting quarterly to share experiences and update skills. The methodology consulting group produced and disseminated JAD documentation two to three years after introduction of the methods, to clarify roles and responsibilities. At the time of the study, informants at Alpha indicated that JAD methods had become a well-established part of the ISD process. However, there was little current JAD activity as JAD methods were used primarily for new development, and there was little new development underway at the time.

IS management at Beta hired an experienced project manager in 1987 to promote use of a systems development life cycle and JAD methods. Along with another IS corporate staff member, she worked intensively for two to three years to encourage JAD use, conducting many JAD workshops and consulting on the use of JAD methods with IS project leaders. Documentation was updated to guide project leaders to use JAD methods on projects considered

Table 1. Interviews Conducted

Research Site	Total Interviews Conducted	IS Project Managers	Business Managers	Facilitators	IS Project Leaders/ Facilitators
Alpha	10	1	2	2	5
Beta	8	1	3	2	2
Gamma	15	7	5	3	0
Other	6	3	0	3	0
Total	39	12	10	10	7

“appropriate” for this approach. Over a dozen IS developers received training in JAD methods and began acting as part-time facilitators. Informants indicated that JAD methods were routinely used on significant projects. During the time frame of the study, at least one major project utilizing JAD methods was underway.

In Gamma, a corporate productivity group seeking analytic tools and methods to enhance systems development activities introduced JAD methods in the mid-1980s. After a systematic vendor selection process, Gamma acquired licensing rights to a proprietary JAD method, hired consultants to conduct a pilot project and to train in-house facilitators, and established a small corporate IS staff to provide facilitation services. An in-house facilitation training class was developed and members of the distributed IS development staffs received training. Project leaders were provided with documentation on the proprietary methodology, in-house developed facilitator guidebooks, and project planning software which identifies appropriate situations for JAD use. Use of JAD methods has been fostered by word-of-mouth referrals, educational/marketing presentations by the corporate staff, management endorsement, and ISD policies which enforce certain activities (e.g., a requirement that data models, often developed in JAD workshops, be designed for all new databases). All informants indicated that JAD was a well-established practice at Gamma. However, there was little JAD activity at the time of the study, because JAD was used only on new development or major enhancement projects, and such work represented a small percentage of ISD activities at Gamma at the time.

Looking across these three sites, similarities in the adoption process become apparent. In each case organization members introduced a JAD method as one of several initiatives aimed at improving the systems development process in their organizations. Organizational resources such as facilitators and training classes were provided to promote

and enable use of JAD methods. JAD participants’ experiences with and understanding of JAD methods were articulated and made available to other organization members through ISD policies, planning guides, training, and consulting. After several years of experience, JAD methods appeared to be well-established, even routine, elements of the ISD process in these organizations.

Although the adoption process was similar at the three research sites, each site formally incorporated espoused JAD methods and provided JAD resources in ways that were consistent with their particular ISD process and organizational context (see Table 2). For example, at Alpha, JAD methods were implemented along with the information engineering systems development methodology (IE) and their use in ISD was strongly linked to use of that methodology. At Gamma, where a proprietary JAD methodology was implemented and where facilitation services remained a largely centralized staff service, facilitators tended to perform a broader set of tasks in the JAD workshop process.

### 3.2 Espoused JAD Methods Versus JAD as Practiced

In spite of the contextual differences noted above, similarities in the ways in which users of JAD methods at each research site tended to modify espoused JAD methods *in practice* became apparent during data analysis (see Table 3). The remainder of this section discusses four areas in which espoused JAD methods were typically adapted during ongoing use at the research sites: modifications to the JAD workshop approach, structural limitations to participation in JAD workshops, budgetary control on selection and use of JAD facilitators, and reliance on analytical IS models for defining business requirements.

**Table 2. Incorporation of JAD Methods at the Research Sites**

	<b>Alpha</b>	<b>Beta</b>	<b>Gamma</b>
<b>Type of JAD method used</b>	Custom in-house method	Custom in-house method	Proprietary method
<b>Typical uses of JAD methods in ISD</b>	In new development or systems replacement, to conduct phases of the IE life cycle (ISP, BAA); more recently, in structured review sessions.	In new development or systems replacement, to collect data on requirements.	In new development or systems replacement, to produce process models, data models, logical record designs, design output (reports) during analysis activities.
<b>Corporate IS facilitator staff</b>	None at time of study	Small staff provides facilitation services part time.	Small staff provides facilitation services. Facilitators are experts in data modeling or process modeling.
<b>Other facilitator staff resources</b>	IS staff in the decentralized development groups are available part-time to facilitate projects.	Same as Alpha	Staff in the decentralized IS groups have received training. However a corporate facilitator typically is used.
<b>Charges for facilitator time</b>	No chargeback but management approval required if facilitator is not part of budget control group.	Corporate facilitators charged on a per-day of workshop basis.	Corporate facilitators charged on a per-hour basis.
<b>Typical facilitator tasks</b>	<ul style="list-style-type: none"> <li>• Project screening in initial meetings</li> <li>• Consulting with project leader to develop agenda</li> <li>• Workshop logistics</li> <li>• Workshop meeting facilitation.</li> </ul>	Same as Alpha plus: <ul style="list-style-type: none"> <li>• Workshop documentation in some cases.</li> </ul>	Same as Alpha plus: <ul style="list-style-type: none"> <li>• Preliminary interviews with key individuals, preliminary analysis</li> <li>• More direct control of JAD process</li> <li>• Follow-up documentation and issue resolution.</li> </ul>

### 3.2.1 Modifications to the JAD Workshop Approach

The JAD workshop approach is fundamental to espoused JAD methods. The workshop might last several days or even weeks, depending on the scope of the project and the JAD method used. Espoused JAD methods emphasize the

importance of securing attendance at these sessions by the "right people," i.e., users with business knowledge and/or decision-making authority relevant to the project. Expected benefits, such as reduced development time, improved system quality, and increased user commitment to the system are presumed to flow from this approach:

**Table 3. Typical Modifications to Espoused JAD Methods as Practiced**

Espoused JAD Method	JAD Method As Practiced at Research Sites	Potential Consequences of Such Use
Concentrated, off-site workshop to speed development, build user commitment to system.	Series of 2-3 hour meetings spread over weeks or months to accommodate limited time availability of users.	Benefit of reduced elapsed time for ISD may not be realized.  Focus and attention of JAD participants may be difficult to maintain.
Users with essential business knowledge and / or decision-making authority work together in workshops, enabling consensus on requirements to be reached.	Workshop sessions are organized to reflect the organization's hierarchy: <ul style="list-style-type: none"> <li>• Top managers attend brief executive sessions;</li> <li>• Middle managers and/ or staff attend detailed sessions;</li> <li>• Actual system users often do not attend workshops; they are represented by IS liaison staff or management in workshops.</li> </ul> Workshop activities may be arranged to minimize attendance by business area personnel, e.g., attending only specified sessions.	Degrees of freedom in the design may be lost as a result of early decisions made in executive sessions.  Without actual involvement, "user commitment" to the application may not extend to system users.  The appropriate/knowledgeable people may not be involved.  A common understanding/vision of the system may not develop.
"Neutral," "impartial" facilitator serves as session leader, to manage group dynamics, promote equal participation, and ensure workshop objectives are met.	In-house facilitators are typically in the IS department and have an IS background.  Facilitators may be drawn from the same ISD group, may be assigned to the project, or may be the IS project leader.	Facilitators can unintentionally influence workshop outcomes through the power of their role if they are too knowledgeable about the application area.  If facilitators are viewed as biased, they will have less credibility and be less effective as session leader.
Focus on business needs; avoid technical jargon to ensure that users articulate, understand and agree on business requirements.	Activities to produce analytical IS models, such as process models, data entity models, CRUD matrices (create, read, update, delete), are featured on the workshop agenda.  Business area participants receive little or no instruction in these techniques prior to the workshop.	Business area participants may be unable to participate effectively: <ul style="list-style-type: none"> <li>• if they are unfamiliar with technique and terminology;</li> <li>• if they are unable to articulate their business requirements or to determine if requirements are being met through these models.</li> </ul> Business area participants may lose interest in the workshop if they fail to see the relevance of these activities.

*JAD shortens the systems development time. It reduces months of meetings to one workshop attended by everyone involved in the project. Agreements are finalized because everyone affected is there. This group consensus short-circuits the traditional approval process, where draft documents sit on reviewers' desks for days or weeks. (Wood and Silver 1989, pp. 245-246 [emphasis added])*

While there were instances at each site in which the JAD workshop approach was implemented as espoused, over time, such rigorous applications of JAD methods were less common. Most of the study participants reported that this idealized approach was less than feasible, because the time required from business area personnel to execute a workshop was a major limitation on the use of the JAD method. They noted that if a project had a low priority, attempting to use JAD workshops could actually extend the elapsed time for requirements definition, because it was difficult to schedule participants' time. Even on priority projects, workshop schedules often reflected the limited time business area participants had to dedicate to ISD activities, as two business managers commented:

"We met two to three times a week for two to three hours a session. That's not ideal, but with time constraints, that's all we could do."

"They [workshop sessions] were always three hour meetings. We thought of doing a longer session, like the three day sessions, but we had trouble scheduling for longer than three hours, due to problems with scheduling people."

Time constraints on business area personnel also affected the type of people who participated in workshops and the extent of their participation. A headquarters business manager described the use of JAD sessions to define requirements for an MIS system for field managers:

"We didn't use the [field managers] in the actual JADs. It was too much time. We met too often. We couldn't bring them out of the field that often. We knew that we [three headquarters managers] knew 80 to 90% of the requirements. We felt that was good enough."

In other cases, the amount of time business area participants spent in the workshop meetings was minimized. One business project manager described her approach:

"Some parts [of the workshop] needed people with detail knowledge. Other parts, just the steering committee to set direction. We set it up to do the current situation, then make the presentation to managers. These people [with detail information] left, but were available by phone."

Time limitations also appeared to affect interaction among participants during the JAD workshop. For example, one facilitator commented on a workshop in which time constraints affected the outcome:

"In this group, we didn't get to consensus too often because we let the schedule drive us."

He then added:

"Organizationally, Alpha hasn't dealt with the time commitment of clients [business users]."

It appeared, then, when they scheduled a JAD workshop to accommodate the limited time availability of users, JAD participants accepted a limited, part-time role for business users in this ISD activity. As a result, the JAD workshop became a series of meetings, stretched over weeks or months.

### **3.2.2 Structural Limitations on Participation in the JAD Workshop**

According to espoused JAD methods, assembling the "right people" in a workshop in which they participate on an equal footing results in a higher quality definition of system requirements and increased user commitment to the application (Wood and Silver 1989). While study participants frequently articulated this ideal, careful examination of their descriptions of JAD planning and execution activities suggests that hierarchy and status influenced both who was selected to participate in a workshop and how participants interacted in the workshop. For example, two IS project managers described major development projects in which they planned JAD workshops to coincide with the organizations' hierarchical structure. Higher level management made decisions on project scope and direction in one session, and then lower level managers or staff, in separate workshops, detailed system requirements within these parameters. In one case, actual system users did not attend the JAD sessions at all but were involved in more traditional ways, such as being sent documentation to review, being interviewed, or receiving presentations about the system.

Comments by study participants also suggest that status and hierarchy subtly influenced interactions during workshop execution. Commenting on a workshop involving the vice president of a business organization and his direct reports, an IS project manager noted:

“It was quite free exchange. [Other participants who reported to the VP] did, however, list as one of the reasons for doing it, [that] ‘Tim wants it.’ So, you know, you have to caveat that free exchange slightly.”

He noted interaction processes that may result in some participants being more influential than others:

“It’s very obvious, in a group of [business] peers, who is being listened to and who isn’t....There is some dynamic at work that helps delineate correct responses from less correct responses.”

The facilitator role in a JAD workshop is intended to manage these types of group dynamics. Several JAD participants interviewed for this study commented that the facilitator was, in fact, able to promote equal participation. However, the status and hierarchical position of the facilitator may limit the extent to which he or she can be effective. One facilitator at Alpha described a project experience in which she had difficulty controlling the group:

“Everyone else in the room was high level. How do you tell a second VP to shut up? If I’d had some authority, I’d be more comfortable telling a second VP, ‘You’re out of line’.”

Thus, it appears that, at these sites, IS project planners tended to plan and execute JAD workshops in ways that recreated the organization’s status and hierarchy structures. One result was that actual system users (versus top managers and staff) had little active participation in JAD workshops.

### 3.2.3 Budgetary Controls on Selection and Use of JAD Facilitators

Using a JAD workshop leader trained in group dynamics and meeting facilitation is another technique critical to espoused JAD methods. The session leader/facilitator is expected to manage the dynamics of the group, ensuring equal participation by attendees and keeping the workshop session moving through the agenda. To accomplish this, espoused JAD methods recommend that the facilitator be “impartial,” “neutral,” and “objective,” coming neither from the user or IS departments (Wood and Silver 1989).

Although study participants discussed the importance of having an “impartial” session leader/facilitator, several noted that they had been constrained by resource control structures (ISD budgets, chargeback policies) from using facilitation staff in the prescribed way. Instead, they shortened workshop schedules to minimize facilitators’ time (and thus the charge) or used facilitators already in their budget, even where such facilitators were developers assigned to the project. At Alpha, for example, several facilitators noted that, in recent years, project managers seemed to use people trained in facilitation from their own business areas or members of the project team, because these people were in the same budget control group. Similarly at Beta, one facilitator noted that she had been trained as a facilitator specifically to support projects in her work group, so that charges for using the corporate facilitator could be avoided. At Gamma, where facilitation is a centralized service which is charged on an hourly basis, facilitators noted that workshops tended to be shorter as the ISD organizations came under financial pressure. Five day workshops were rare. Even two or three day sessions were sometimes squeezed into one day to reduce chargeback costs.

### 3.2.4 Reliance on IS Analytical Models for Defining User Requirements

An IBM marketing brochure describes JAD as “a technique for documenting business requirements *from the users’ viewpoint*, rapidly and accurately, *in a language the user understands*” [emphasis added]. The role of an IS participant is usually described as “observer” or “technical expert” in the professional literature (Wood and Silver 1989), and hence not as the primary player in the workshop. However, workshops described by study participants appeared to reflected the language and requirements of the IS developers. As one IS project manager described the process [emphasis added],

“We had to start *extracting out of people’s heads* what are all the things that the system does...to *clarify for us our description* of how things are done today.”

The objectives of most of the JAD workshops discussed were to produce analytical IS models, such as process models, data entity diagrams, functional decomposition diagrams, logical record designs, and so on. Business area participants typically received only written descriptions or a brief introduction to these techniques in a pre-workshop presentation. In the workshop sessions, facilitators used a combination of open-ended exercises (for example, brainstorming techniques) and structured IS analytical exercises



to elicit the information for these models from JAD participants. At Alpha, where JAD sessions were used to conduct phases of the Information Engineering life cycle, a CASE (Computer Aided Software Engineering) tool was sometimes used during the workshop to collect and document information for IS models, which further structured workshop activities along these lines.

Most IS informants saw no difficulties with this approach. Typical comments were:

"They [business participants] did quite well. At first, with the context diagram, not so much. When we did away with the shapes and concentrated on the relationships between the data, they caught on. By the end, they understood it well."

"The data model was a form everyone could use."

"The users were very comfortable with the data elements approach."

However, a few IS study participants, as well as several business area informants, questioned the effectiveness of IS analytical models for articulating of their business requirements. One business area manager, while commenting positively about his workshop experience and the resulting system, expressed his frustration with the data modeling exercise:

"Doing the data model. We'd go crazy. The world changes, the law changes, the business changes....We had to say, stop. We can't get the model perfect. Things got really bogged down."

His later comments suggest that data modeling was not an effective medium for him to express his business requirements:

"Depending on whose viewpoint, you can put a different definition on a term. It's hard to distill it to basic, indisputable facts....We're not sending rockets to the moon, we're selling life insurance....In sales, you don't have to be so precise."

Other business area informants similarly voiced their frustration with detailed IS analytical modeling activities. In a project at Gamma, the business area manager lost interest and stopped attending sessions as the modeling exercises got more detailed. A facilitator at Alpha described a series of workshop meetings dedicated to producing a data entity model, in which hostility that arose between the business area participants and the data modeling expert persisted for several years after the session.

### 3.3. Implications of Modifications to Espoused JAD Methods

As noted earlier, many benefits are attributed to use of JAD methods. When study participants were asked about outcomes of using JAD methods, several mentioned such benefits. For example, several IS managers commented that their time and effort to define requirements were reduced through the workshop. Both IS and business area informants commented that IS developers learned a lot, in a short time, about business and system requirements. Many study participants mentioned reaching agreement on system requirements and project scope and improved relationships among IS and business area team members as outcomes of the workshop sessions.

However, the ways in which JAD participants at the research sites modified espoused JAD methods *in practice* seem to have limited the extent to which these benefits were achieved. For example, when the JAD workshop schedule is stretched out over weeks or months of two to three hour meetings, one of the desirable benefits of JAD — reduced elapsed time — may not be realized. When managers and liaison staff are substituted for actual system users in JAD sessions, "user commitment" and "buy-in" to the system may not develop among the broader group of system users. Table 3 summarizes possible implications of modifying espoused JAD methods in the ways described above.

## 4. IMPLICATIONS FOR THEORY

Empirical data collected at the three research sites suggests that, as they adopted a JAD method and incorporated it into the larger ISD process, these organizations tended to appropriate espoused JAD methods in ways that reflected and reinforced their status quo ISD process. The *forum* for user involvement in ISD changed with the adoption and use of a JAD method, but the *content and process* changed very little. Roles and responsibilities of technical versus business participants, ISD resource allocations (e.g., staff time), analytical activities conducted, and so on, remained essentially the same.

Analysis of these data highlighted ways in which *ISD structures* influenced the observed outcome. At the same time, the influence of *actions* by JAD participants was apparent in decisions to modify espoused JAD methods in practice. In the following sections, insights from institutional theory are considered in interpreting structural influences, and insights from mutual adaptation theory are considered in interpreting the influence of action and agency. The complementary nature of these analyses is then discussed.

#### 4.1 Institutional Theory

Institutional theory, as it has developed in the organizational literature (DiMaggio and Powell 1983, 1991; DiMaggio 1988; Jepperson 1991; Meyers and Rowan 1977; Scott 1987, Tolbert and Zucker 1983; Zucker 1977, 1983, 1987) provides insight into why adoption and implementation of new ISD methods such as JAD often result in little substantive change to ISD processes and outcomes. Institutions are social orders or patterns that, over time, become taken for granted (Jepperson 1991). They enable or empower human interaction, by serving as a type of coordination mechanism to bring expectations and actions into alignment. Simultaneously,

institutional arrangements constrain individual behavior by rendering some choices unviable, precluding particular courses of action, and restraining certain patterns of resource allocation....Institutionalized arrangements are reproduced because individuals often cannot even conceive of appropriate alternatives (or because they regard as unrealistic the alternatives they can imagine).

(DiMaggio and Powell 1991, pp. 10-11)

Applying an institutional interpretation to the current study, we can see the explanatory power of this perspective. An institutional interpretation suggests that, as they applied JAD methods, JAD participants at the research sites tended to make choices based on taken-for-granted assumptions about ISD, fitting the new method into existing patterns for ISD. This can be seen, for example, in the way that JAD participants accepted as given part-time user involvement in JAD workshops, or in the way that IS project managers assumed that workshop participation should be structured in conformance to their organization's hierarchical structure. The effect of structural resource controls such as charge-back mechanisms can be seen in the way that session leaders/facilitators were selected. Institutionalized IS analytical models were routinely used in JAD sessions, in spite of the potentially dampening effect on effective participation by business area participants.

Institutional theory suggests a future course of research on structural influences on JAD adoption and use. DiMaggio and Powell (1983), for example, posit that organizations respond to normative, professional pressures. Meyers and Rowan (1977) posit that organizations adopt new methods that have attained a level of "legitimacy," even though these methods, once implemented, have little impact on technical production practices. This suggests that, in adopting ISD process innovations such as JAD, ISD organi-

zations may be enacting professional norms, and that enhanced legitimacy for the ISD organization may be a more likely organizational outcome than tangible improvements in ISD efficiency or effectiveness. Notably, among IS informants in this study, "improved relationships with users" was frequently cited as a major outcome of the JAD workshop. Drawing on these concepts, future studies of JAD adoption and use could investigate the channels through which JAD methods diffuse among ISD organizations,<sup>5</sup> the underlying motivation and expectations of organization members who introduce JAD methods, and the *symbolic*, as well as substantive, outcomes resulting from adoption and use of JAD methods.

#### 4.2 Mutual Adaptation

Leonard-Barton's (1988b) theory of technical process change as mutual adaptation of technology and organization provides insights into studies of ISD process innovation from the agency perspective. She posits that misalignments in the technology, the delivery system, or the performance criteria of the adopting organization frequently lead to the need for changes in the technology, the organization, or both, during implementation. Managers interpret the implementation characteristics of a new process technology (in this case, a new ISD method such as JAD) and respond with implementation strategies that largely determine the kind and degree of change (1987, 1988a, 1988b, 1988c).

Applying this perspective to the current study, mutual adaptation theory suggests that the ways in which managers and staff interpreted espoused JAD methods and managed the implementation process largely determined the observed outcome at the research sites studied, that is, the adaptation of espoused JAD methods in conformance with the existing ISD process. This outcome might be attributed to the conscious desire of these managers to minimize impact on the existing ISD process, to their misinterpretation of critical features of espoused JAD methods, or to an inadequate implementation process. The stories told by study participants about the JAD adoption process in their organization suggest that management did desire substantial improvements in the ISD process through adoption of a JAD method. However, discrepancies between essential characteristics of espoused JAD methods and existing ISD processes, delivery systems, and performance criteria were not identified and addressed. For example, the assumption underlying espoused JAD methods that users would be able to commit days, or even weeks, of full-time attention to systems delivery tasks in the JAD workshop frequently conflicted with the reality of limited time availability. Although in the initial flurry of pilot projects full-time participation was sometimes possible, long term, this

discrepancy was not resolved. JAD participants adapted the workshop approach to this organizational constrain. Similarly, by placing JAD resources such as facilitator staffs in the ISD organization and by allowing IS project managers to determine their use, it is hardly surprising that, in practice, JAD methods came to be used in ways that conformed to the status quo ISD process.

Mutual adaptation theory could inform future studies of JAD adoption and implementation projects by focusing attention on the actions of managers, for example, whether managers charged with implementation of JAD methods perceive misalignments with existing ISD processes, JAD delivery mechanisms, and ISD performance evaluation systems and whether these discrepancies are addressed during implementation.

### 4.3 A Structural Perspective

Structural interpretations, such as those drawing on institutional theory, and agency and action interpretations, such as those drawing on mutual adaptation theory, provide complementary interpretations of the data collected in this study. Orlikowski and Robey (1991) note that explanations of social phenomena such as JAD adoption and use must consider both the role of human action and the effects of existing institutional properties. They propose a research agenda based on structuration theory<sup>6</sup> for empirical investigations of the process of systems development. For research purposes, they suggest that the effects of structure and action may be studied separately (p. 158). Understood within this framework, institutional and mutual adaptation arguments both inform interpretation of the data collected in this study and may both contribute to future research and theoretical development in this area.

## 5. CONCLUSIONS

JAD methods are heralded by consultants and enthusiastically endorsed by organizations experienced in their use. In this study, all of the people interviewed spoke favorably about JAD methods and believed that their use resulted in favorable outcomes. However, data collected at the three research sites suggests that, as they adopted the JAD method and incorporated it into the larger ISD process, these organizations tended to appropriate espoused JAD methods in ways that reflected and reinforced the status quo ISD process at these organizations. That is, by and large, the level and nature of user participation in JAD workshops was constrained by the limited time business area personnel had available for workshops. JAD participants were selected, and tended to interact in the workshops, in conformity

with the hierarchical and status structure of the organization. Actual system users often were not directly involved in the JAD workshops. Facilitation staff were controlled through existing ISD budgetary control structures, inhibiting the prescribed use of these staffs. Workshop activities were focused on IS developers' models and terminology, and business area personnel, with little or no training, were expected to participate on those terms. In summary, although the *forum* for user involvement in ISD changed with the adoption and use of JAD methods, the *content and process* for user involvement changed very little from the status quo ISD process. As a result of such usage, the potential for realizing substantial benefits typically ascribed to JAD methods was limited.

This analysis does not imply that JAD methods can not be useful or beneficial in ISD activities. Rather, my point here is to illustrate how, in adopting and incorporating a new process method (e.g., JAD), little substantive change in the ISD process apparently occurred. An implication for management is that, if substantive change in ISD processes and outcomes through the adoption of new methods such as JAD is desired, then implementors must ensure that the existing ISD process is consciously analyzed, and, where appropriate, challenged. Managers charged with the responsibility of incorporating JAD methods might question, for example, decisions to exempt actual system users from workshop participation due to time availability or extended workshop schedules that reflect part-time participation of business area personnel. Without such reflection and follow-up action, substantive change in the ISD process from adoption of JAD methods is likely to fall short of expectations. When changes are not possible, expectations for benefits from JAD methods should be adjusted accordingly.

Two theoretical approaches to interpretation of the data collected in this study and to future research on JAD adoption and use were reviewed. Institutional theory focuses on the constraining effects of existing organizational patterns and suggests that, although organization members introducing JAD methods might intend to create significant changes in ISD outcomes, adoption and use of JAD methods often results in modest improvements in the ISD process. Mutual adaptation theory focuses on the interpretations and actions of managers charged with adoption and implementation of ISD process innovations (i.e., JAD methods). This theory suggests that the ways in which managers interpret espoused JAD methods and manage their implementation largely determine the extent to which JAD methods are adapted to fit existing organizational practices, and hence, the likelihood of enhanced ISD outcomes. These theoretical approaches inform our understanding of ISD process change in a complementary fashion within the structural framework.

As this study was exploratory and the sample size small, no generalizations to other organizational settings is made here. It is possible that some organizations have experienced substantial changes in their ISD process due to the adoption of JAD methods. Examination of such cases may highlight circumstances in which implementation of new process methods such as JAD do result in substantive changes to ISD processes, structures, and outcomes. Through multi-case comparisons, a model for adoption and use of ISD process innovations could be developed within the structurational framework, drawing on theoretical approaches such as institutional theory and mutual adaptation theory.

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## 8. ENDNOTES

1. For example, IBM's Joint Application Design (JAD) and Joint Requirements Definition (JRD), The Method (ATLIS/PRI), WISDM (Wise), Consensus (Boeing Computer Services), Rapid Analysis (C&EC), APLAN (Odyssey), FAST (GMRush), RAD (JMartin). The various JAD methods differ primarily on the systems development tasks addressed (planning, requirements, user interface design) and the analysis techniques favored (data-focused versus process focused). See Rush (1985) for a comparison of several techniques.
2. For the purposes of this paper, JAD is considered a *method* which embodies an *approach* to systems development activities (e.g., joint participation by IS and system users) and which includes various techniques (e.g., meeting facilitation, group problem solving exercises). The term *espoused JAD methods* is used to refer to the policies, practices, and procedures commonly advocated in JAD handbooks and articles, or described in proprietary JAD manuals.
3. This list was compiled by the author, based on a review of JAD manuals, books, and business press articles.
4. For example, Rush (1985) reports that, in a pilot project in 1983, CNA Insurance of Chicago compared the IS effort required to define requirements in a project utilizing JAD to a "control" project which did not use JAD. The JAD project reportedly required 2.5 hours per function point during the requirements phase, compared to 5.2 hours per function point for the non-JAD project. He describes this "result" as a 200% improvement in productivity. Gill (1987) refers to the same instance as a 50% improvement in CNA productivity.

5. For example, JAD facilitators' user groups, educational programs, consultants promoting JAD services, methodologies such as Information Engineering which are embedding JAD methods (Martin 1990).
6. A description of structuration theory is beyond the scope of this paper. See Orlikowski (1992) for a structuration theory of technology and Orlikowski and Robey (1991) for a structurational framework for MIS research.