Perceived Effects of ERP on Jobs and Work in a Contact Center

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Abstract: This paper reports empirical results of research on perceived impact of ERP technology on contact center jobs and work organization. It uses an adapted version of Torkzadeh and Doll's (1999) instrument and a Q-methodology approach to identify and describe six viewpoints regarding an ERP system's effects on task productivity, task innovation, internal or external customer service, and management control. .

Keywords: ERP, enterprise systems, impact of technology, contact centers, users, workers, Q-method

1. Introduction

The performance problems and high failure rates that are frequently reported in connection with adoption of ERP (enterprise) systems reflect the steep learning curve that firms face in mastering these complex business tools. At present, most actionable knowledge about management of ERP systems encompasses the implementation process and it relates to software modules used in back-office or production environments. However, management knowledge needs are changing as ERP adopters begin to face post-implementation performance challenges and as ERP systems extend into customer-facing or front-office work environments where the boundary between the organization and the outside world is porous and interactive.

The organizational effects of ERP systems are massive (Hall, 2002), but neither scholars nor practitioners have yet produced a way of systematically understanding the implications of enterprise integration for work organization, jobs, and labor productivity. Work organization can be described in terms of time constraints (job demands) and job autonomy (job control) (Dhont, Kraan, and van Sloten, 2002). The ERP-enabled work system is a sociotechnical system with organizationally specific dimensions of structure (constraints) and agency (decision-making latitude). An important part of the ERP learning curve in an adopter organization consists of working out and learning the routines for primary business processes and their exceptions. Although ERP imposes the logic and rhythm of a particular work system design, areas of indeterminacy remain, leaving scope for choice, creativity, and resistance in the workplace in a dialectical process (Robey, Ross, and Boudreau, 2000) of path creation.

Adoption of any innovation requires co-invention by the adopter. Co-invention refers to the process of customizing and adapting the invention to the users' needs. In the case of enterprise integration via ERP software, co-invention requires substantial complementary investment in learning and organizational innovation in order to realize value from the software (Bresnahan and Greenstein, 2001). However, as successive generations of business tools move the firm from discrete "islands of automation" to process integration and internetworking, the impact of the technology on the organization increases and the difficulty and complexity of realizing business value also increase substantially.

Perceptions of impacts of technology are of interest because they reflect lived experiences of technological change. Insofar as perceptions have organizational consequences, they are real and must be addressed in change management and organizational learning initiatives. Any changes in a technology such as ERP that directly controls business processes, work rhythm, information content, and decision scope will affect job satisfaction and job performance. In customer-facing service work, job satisfaction is a strong predictor of service quality. The psychosocial aspect of work is a major issue in contact center research, but it has been infrequently addressed in the context of ERP-induced changes in service workplaces. This paper summarizes results from a study of perceived impacts of an ERP system on work in an inbound customer contact center in a firm in the energy sector, 'EnergyCo.' The paper uses Q-methodology, a structured inductive exploratory approach to organizational research, to identify and describe ways that customer service representatives and agents experienced the impacts of a Customer Care Solution (CCS) on their jobs and work. When this research was conducted the EnergyCo contact center was about 18 months into its ERP implementation, and workers' comfort level with the CCS was high enough that the technology itself was not a major workplace issue. Research shows a pattern of six perceived impacts of technology, of which three are bipolar (an indication of controversy) for a total of nine viewpoints. Is the existence of such opinion heterogeneity surprising or is it a normal feature in a workplace that is undergoing multiple changes in a journey towards customer-centricity?

2. ERP, Jobs, and Work Organization

Many of the challenges presented by ERP systems are also present in smaller or less integrated software systems, and much can be learned from prior research on effects of infor-

mation technology on work organization. Crowston and Malone's (1994) survey of research literature identifies four perspectives on organizations (rationalist, information processing, motivational, and political), and ten central issue areas (employment effects, locus of control, differentiation, formalization, patterns of communication, linkages, social context cues, job-related individual and interpersonal factors of motivation, and power).

A comparable corpus of research does not yet exist for ERP systems. Hall's (2002) survey of the research literature on ERP-related job and change in work organization identifies four major organizational effects of ERP adoption: 1) automation of some administrative jobs, especially those that provide routine data entry services. 2) delayering and downsizing. 3) intensification of work and increase in range and depth of required skills in remaining jobs. 4) increase in centralized control of the enterprise with decentralization of responsibility for specific tasks and operations.

ERP systems have several characteristics that seem to make their organizational effects qualitatively different from earlier generations of information technology. The first characteristic is a vast increase in scale: because of integration, successes as well as failures can have large-scale organizational impacts, making it difficult to generalize about ERP business value from a small number of cases (Hitt, Wu, and Zhou, 2002). Misalignments of IT and organizational structure appear to be difficult to identify and correct early enough to avoid costly rework at a later stage (Sia and Soh, 2002).

In the second place, ERP systems create transactional intraorganizational interdependencies by integrating business processes such that every action has effects elsewhere in the organization (Kallinikos, 2004). Errors that in earlier systems were contained in localized environments now propagate quickly along business processes and must be corrected before other workflows can take place. The systems are complex and initially operate as black boxes. It is not simple for non expert users to untangle configuration, data, and human errors, and this affects the efficiency of individual and organizational learning. However, once the system is mastered, the abundance of codified transactional data permits unparalleled organizational transparency (ibid.).

In the third place, two of the most widely used frameworks for measuring information system adoption and use – the Technology Acceptance Model (TAM: Davis, 1989 [unrelated to the present author]) and the Delone-McLean IS Success Model (1992) assume that use of information systems is discretionary and that user satisfaction is a good predictor of IS success. However, in an ERP-enabled work environment, use of the system is mandatory. Workers may be more or less satisfied with the system or use the system more or less effectively, but they have to use it whether they like it or not because they cannot accomplish their work without it. Explanations of ERP system business value creation must therefore modify prevailing models of IS system success to take into account worker, manager, and executive competencies as users (Meta Group, 2003; Kraemmergaard and Rose, 2002) and the effects of user competency on system outcomes.

In sum, ERP systems represent a significant extension of earlier information technology in terms of scale of organizational effects, transparency of intraorganizational transactions, and pervasiveness of the technology in the work environment.

3. Business Logic of Contact Centers

Customer contact (call) centers) are a relatively new and increasingly widespread form of technology-enabled work organization – a kind of ICT-enabled remote service delivery (Gans, Kolle and Mandelbaum, 2003). In North America, between 1.5M and 1.8M people are employed in nearly 60,000 contact centers. Technological change is enabling major transformations of the customer service function. From simple call centers charged with routine inbound service work, some customer interaction centers are becoming multimedia-enabled, artificial intelligence-enhanced, multi-channel customer relationship management centers that are tightly linked to the rest of the firm with enterprise application software, driving business processes and workflows in the back office.

Service delivery everywhere is faced with the trade-off between quality of service and the cost of delivering it. Mass production or transaction oriented call centers attempt to reconcile the need for service quality with their search for efficiency by practicing "sacrificial HR strategy" – the "deliberate, frequent replacement of employees in order to provide enthusiastic, motivated customer service at low cost" (Wallace, Eagleson, and Waldersee, 2000). For this reason, improvement in working conditions in mass production contact centers is not necessarily compatible with the business logic of the firm. However, the situation is different in professional service production models of contact centers because relationship management is a primary concern and so consistent service quality is essential (Batt and Moynihan, 2002). Contact centers that adopt the professional service production model attempt to build long term personal relationships with customers, and so provide superior service (Kaplan, George, and Marines, 2000). The more relationship-oriented the contact center, the more the center will adopt high involvement HR management practices characterized by service worker autonomy, task variety and interdependence, teamwork, and task integrity. The more transaction-oriented the contact center, the more it will adopt human resource management practices characterized by task routinization, scripting, cost minimization through volume of production, worker isolation, and electronic surveillance (Batt and Moynihan, 2002). Hybrid or mass customized models combine some aspects of transaction oriented contact centers with some aspects of relationship oriented contact centers (ibid.). Mass customized customer service attempts to compete on quality, customization, and price. Firms adopt engineered processes and automated workflows but allow agents to provide quality service to engender cus-

tomer loyalty. ERP and contact center technologies can support the range of strategies from transactional to relational.

The EnergyCo contact center has many characteristics of the hybrid model. It is unlike many contact centers in that it is an in-house center that is located in physical proximity to the rest of the firm. Workers are members of a collective bargaining unit and career moves are possible from the contact center to other positions within the larger firm. Because of its up to date technology, the EnergyCo contact center is regarded as a desirable workplace, especially among younger contact center workers. At the same time, it is an inbound center and call throughput is the principal measure of performance.

Little is presently known about the consequences for job design and work organization of using increasingly complex information technologies in customer service work in transaction oriented and in relationship oriented contact centers. It is important to understand the relationships among job characteristics, work organization, job satisfaction, physical and psychosocial (stress) dimensions of health and wellness, human resource management practices, and performance outcomes in customer contact centers of each type (Davis and Moro, 2004).

4. Perceived Impacts of ERP on Contact Center Work

I identified discrete viewpoints about impacts of ERP on work in the EnergyCo customer contact center with Q-methodology, in which respondents rank order items – in this case, 37 statements about possible effects on technology on work adapted from Torkzadeh and Doll's (1999) instrument. This instrument contains eleven statements about perceived impacts of technology on productivity, six about task innovation, nine about customer satisfaction, and eleven about management control, as shown in Table 2. Q Methodology provides a systematic means of describing human subjective states through the combination of qualitative and quantitative analysis (Brown, 1980). Twenty-five customer service representatives and agents from the EnergyCo contact center sorted the statements from "most agree" to "most disagree" according to the forced-distribution pattern shown in Table 1, and subsequently explained to the interviewer their reasons for agreeing or disagreeing with various statements. Individual Q sorts were factor analyzed to identify common patterns of rank-ordering, representing shared view points about the impact of technology on work. The six-factor solution models the viewpoints of twenty of the twenty-five respondents

Viewpoint A's positive items refer to task productivity and work effectiveness. The negative items have to do with on-the-job innovation and management control. Viewpoint A regards the CCS as an essential tool, an enabler of contact centre work. Once an agent has learned CCS, the job can be performed effectively. Work routines are defined by the system. Neither management nor workers really control the work routines – they are pre-scripted and elicited by customer demands.

Viewpoint B's positive items have to do with responsiveness to customer needs. The negative items have to do with productivity and effectiveness. The viewpoint is bipolar because two individuals see a contradiction between responsiveness to customers and productivity-effectiveness for different jobs. To a customer service representative (CSR), the CCS is responsive to customer needs and is a productivity enabler. To an administrative services representative (ASR) it is not. It appears that the CCS is too structured for ASR work.

Viewpoint C is another bipolar viewpoint. One pole has to do with the efficiency and effectiveness of work that is enabled by the CCS. The other has to with the scope for changing and improving the work process. Two service reps regard the CCS as a work enabler but do not see scope for improvement of tasks or work processes. However, a coach regards CCS as providing scope for innovation and quality improvement, although too slow and cumbersome. This difference of perception of impacts may reflect differences in job requirements between coaches and service reps, and also degrees of experience.

Viewpoint D CSRs attribute a great deal of their work effectiveness to the CCS, but do not believe that the system contributes to quality control, customer orientation, or work scheduling. Call volume and therefore scheduling are determined by customers, not by software or management. Furthermore, customer orientation is a personal attribute that cannot be provided by software. Service reps with this viewpoint do not believe that the system provides any tools to management to control service quality, delivery speed, or job scheduling. Customers drive the system.

Viewpoint E is bipolar. One pole concerns improvement of job performance by agents and managers. The other pole concerns effects of CCS on time use and scheduling. This difference of perceived impact of the CCS on work revolves around the issue of how much scope really exists or is necessary for managers and agents to control and improve performance, on the one hand, and how much scope do they have to control task completion time, on the other.

Viewpoint F focuses largely on management control of work processes. It regards CCS as essentially a management control tool as well as a work enabler. However, as in Viewpoint D, critical behavioural and attitudinal aspects of contact centre work are not enabled by the system - they are provided by the agent.

Table 3 presents most-agreed and most-disagreed statements by viewpoint and perceived impact. It shows the perceived tradeoffs, viewpoint by viewpoint, among productivity, innovation, responsiveness to customers, and management control. Different expectations regarding job tasks in the contact center account for the different assessments of the impact of the ERP system on task productivity. Most viewpoints consider that the system constrains task innovation among customer service reps, although to some this is a benefit of the technology. Regarding service quality, while some viewpoints consider that the system enhances quality, other viewpoints emphasize that the quality of service is determined by the ser-

vice representative, not the software. Management control issues revolve around the pace of work and quality assurance. Some viewpoints consider that management is very much in control of the work process, while others believe that management plays a largely corrective role via monitoring of calls. Qualitative analysis (not reported here) of respondent's comments about effects of ERP on task productivity, innovation, control, and service quality provide abundant insights into ways to improve IT-organizational alignment.

5. Conclusions

The introduction of an ERP customer care software module into EnergyCo's contact center triggered organizational effects that were still being worked out 18 months later. Increased accuracy, an evolving relationship between the contact center and the rest of the firm as customer-centric business processes were strengthened, new functionalities in the area of billing, and the development of new service capabilities were emerging features of the contact center.

Differences in viewpoints reflect different understandings within the contact center about how the ERP (as a hybrid human/machine system) works or should work, raising issues of performance and work process control. Is contact center performance to be understood primarily in terms of call throughput (efficiency) or in terms of customer satisfaction? How is value created? Many service representatives objected to the idea that service quality was primarily determined by technology rather than by their own contributions. Who can change the system? As service reps became fluent users of the system, some wished to modify certain features, but the modification process was cumbersome. How is the system steered? Persons in the contact center displayed a wide range of beliefs about the extent or importance of influences of managers' decisions on the system. To some the system appeared to respond to outside forces (fluctuations in call volume), to others it seemed to run on autopilot, and to others, traces of managers were everywhere. This is an issue to the extent that some viewpoints (E and F) look to management to proactively apply corrective action to improve service quality and raise service standards.

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Table 1: contact center workers' viewpoints about the impacts of ERP customer contact software on jobs and work

Viewpoint A

-2	-1	0	1	2
16	11	6	4	1
17	12	13	7	2
23	14	20	8	3
33	15	21	9	5
35	18	24	19	10
36	26	28	22	25
	27	29	31	
	37	30	34	
		32		

Viewpoint B (bipolar)

-2	-1	0	1	2
1	3	12	9	22
2	4	13	11	23
5	6	15	14	24
7	8	17	20	25
10	16	19	26	27
35	18	31	28	32
	21	34	30	
	29	36	33	
		37		

Viewpoint C (bipolar)

-2	-1	0	1	2
12	6	1	2	3
13	10	5	8	4
15	14	23	18	7
17	16	26	19	9
33	21	30	20	11
37	24	31	22	28
	27	34	25	
	29	35	32	
		36		

Viewpoint D

-2	-1	0	1	2
2	1	5	4	7
3	6	11	16	9
20	8	13	19	10
33	12	14	21	18
35	15	24	23	22
37	17	28	25	26
	27	31	30	
	29	32	34	
		36		

Viewpoint E (bipolar)

-2	-1	0	1	2
2	6	1	7	10
3	9	5	20	15
4	13	8	21	16
18	22	11	25	29
24	23	12	28	30
33	27	14	32	31
	35	17	34	
	36	19	37	
		26		

Viewpoint F

-2	-1	0	1	2
3	1	2	10	4
11	5	7	27	9
14	6	8	31	28
17	16	12	32	29
20	22	13	33	30
23	24	15	35	34
	25	18	36	
	26	19	37	
		21		

Table 2: statements of perceived impact and viewpoint scores

Impact of technology on task productivity	**A**	**B**	**C**	**D**	**E**	**F**
1.The CCS increases my productivity.	2	-2	0	0	0	-1
2.The CCS saves me time.	2	-2	1	-2	-2	0
3.The CCS enables me to accomplish tasks more quickly	2	-2	2	-1	-2	-2
4.The CCS supports critical aspects of my job.	1	0	2	1	-2	2
5.The CCS allows me to accomplish more work than would otherwise be possible.	1	-1	0	-1	0	-1
6.The CCS enables me to spend more time on productive activities.	0	-1	-1	0	-1	-1
7.My effectiveness on the job is enhanced by the CCS.	1	-2	2	2	1	0
8.The quality of my work is improved by the CCS.	1	-1	1	-1	0	0
9.The CCS is useful in my work	1	1	2	2	-1	2
10.The CCS assists me in performing my job better.	2	-2	-1	2	2	1
11.The quality of my work depends upon the CCS.	-1	2	2	1	0	-2
Impact of technology on task innovation	**A**	**B**	**C**	**D**	**E**	**F**
12.The CCS helps me identify innovative ways to do my work.	-1	0	-2	-1	0	0
13.The CCS helps me come up with new solutions to job problems.	0	0	-2	-1	-1	0
14.The CCS helps me come up with new ideas.	-1	2	-1	0	0	-2

15.The CCS helps me solve job problems.	-1	1	-2	-2	2	0
16.The CCS helps me find new ways to improve my job performance.	-2	-1	-1	1	2	-1
17.The CCS helps me try out innovative ideas.	-2	0	-2	-1	0	-2
Impact of technology on internal and external customer satisfaction	**A**	**B**	**C**	**D**	**E**	**F**
18.The CCS improves customer satisfaction.	-1	-1	1	2	-2	0
19.The CCS improves customer service.	2	-1	1	1	0	0
20.The CCS makes me more customer-oriented.	0	0	1	-2	1	-2
21.The CCS helps me create value for customers.	0	-1	-1	1	1	0
22.The CCS helps me meet customer needs.	1	1	1	2	-1	-1
23.The CCS helps me adapt to changing customer needs.	-2	2	0	1	-1	-2
24.The CCS enables me to respond to changing customer needs.	0	2	-1	0	-2	-1
25.The CCS helps me accommodate individual customer needs.	2	2	0	0	1	-1
26.The CCS enables me to deal more strategically with internal and/or external customers.	-1	0	0	2	0	-1
Impact of technology on management control	**A**	**B**	**C**	**D**	**E**	**F**
27.The CCS improves management control.	-1	1	-1	-1	-1	1
28.The CCS helps management control the work process.	0	1	2	0	1	2
29.The CCS helps management control performance.	0	-1	-1	0	2	2
30.The CCS enables management to compare work performance to standards.	0	1	0	1	2	2
31.The CCS helps management identify when corrective action is required.	1	0	0	0	2	1
32.The CCS enables management to monitor and correct errors.	0	2	1	0	1	1
33.The CCS enables management to control work schedules.	-2	1	-2	-2	-2	1
34.The CCS enables management to monitor work progress.	1	1	0	1	1	2
35.The CCS enables management to ensure a timely completion of tasks.	-2	-2	1	-2	-1	1
36.The CCS enables management to control resource allocation.	-2	0	0	-1	-1	1
37.The CCS enables management to control quality.	-1	0	-2	-2	1	1

Table 3: "most agree" (+) and "most disagree" (-) statements by viewpoint and impact

	Impact on task productivity	Impact on task innovation	Impact on internal or external customers	Impact on management control
Viewpoint A	+1, +2, +3, +5, +10	-16, -17	+19, +25 -23	-33, -35, -36
Viewpoint B (bipolar: viewpoint B+)	+11 -1, -2, -5, -7, -10		+23, +24, +25	+27, +32 -35
Viewpoint C (bipolar: viewpoint C+)	+3, +4, +7, +9, +11	-12, -13, -15, -17		+28 -37
Viewpoint D	+7, +9, +10 -2, -3		+18, +26 -20	-33, -35, -37
Viewpoint E (bipolar: viewpoint E+)	+10 -2, -3, -4	+15, +16	-18	+29, +30, +31 -33, -35
Viewpoint F	+4, +9 -3, -11	-14, -17	-20, -23	+28, +29, +30, +34

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