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Incorporating Social-Technical Systems Methodology into a Large Scale IS Change Initiative at a Fortune 100 Organization: A Case Study

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INCORPORATING SOCIAL-TECHNICAL SYSTEMS METHODOLOGY INTO A LARGE SCALE IS CHANGE INITIATIVE AT A FORTUNE 100 ORGANIZATION: A CASE STUDY

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ABSTRACT

The purpose of this study is to investigate a large scale information systems change initiative at a Fortune 100 company. This study focuses on how Black Chemical Company (BCC) successfully implemented an information systems change across its global organization. Socio-technical systems methodology was used as an overlay to predict and explain the outcomes of the information systems change initiative that BCC carried out. Results show that the technological change implemented at BCC was successful due to the change methodology. This study aims to show the relationship between BCC's change methodology and socio-technical systems methodology, leaderships' effect on the implementation of the MIS, employees' relationships within and outside BCC, and the implementation strategy of the implementation methodology. A model of Social-Technical Systems Methodology (STSM) will be shared along with the need to incorporate STSM into future MIS implementation strategies.

Keywords

Social-Technical Systems Methodology, information systems, leadership, change

INTRODUCTION

This is a study of organizational change across a global organization. Black Chemical Company (BCC; a pseudonym name used to protect the firm's identity) implemented an enterprise resource planning (ERP) system across its organization over a six-year period. The project was named Homestead. The company developed its own information systems (IS) change methodology based on the SAP Global Methodology created by SAP. By analyzing BCC's IS change methodology, I determined the socio-technical systems methodology propositions that were contained within the change methodology. I used the term Methodology since socio-technical system is both a theory and a method (Taylor & Felton, 1993). It is a theory in that it places "systemic focus on product and customer" (p. 1). It is a method in that it "helps provide custom solutions for performance [problems] by design" (p. 1). The combination of the two is "methodology – an informed approach to organizational improvement" (p. 1). This study was an attempt to understand the descriptive value of socio-technical systems methodology in a large-scale information systems change effort.

BACKGROUND: SOCIO-TECHNICAL SYSTEMS METHODOLOGY IN CONTEXT OF IS CHANGE INITIATIVES

Computer technology has been a key driving force for change in organizations over the past 30 years (Eason, 2001). Early pioneers of computer technology envisioned the workplace being much different than it is in today's business. These pioneers had predicted that computer technology would produce the paperless office, the unmanned factory, the electronic cottage, the collapse of the city, the global village, the demise of the expert, and the leisure society (Eason, 1988, p. 2). Although these predictions have not all come to pass, "the main purpose is to make clear that what begins as a change in technical capability has, through the applications it makes possible, the power to change the way in which we live our lives" (p. 3). Based upon Eason's views concerning technology, as organizations change their technologies, they will ultimately change themselves.

The use of technology in organizations is increasing every day. As computers, information, and communication technologies advance, organizations become more dependent on these technologies. John Loewenberg, CEO of Aetna Information Technology of Aetna Life & Casualty, states in Quinn (1992), "Yet you know you would never have been able to increase your handling of health care claims from 250,000 per week to 1.3 million a day without [information systems]" (p. 360). There are many examples of improvements that technology has given to businesses, governments, and society. Eason (2001) explains that computers "have enormous potential to transform organizational life" (p. 324). Computers have a huge impact on the way work is done in organizations.

FAILURES IN INFORMATION SYSTEMS INITIATIVES

Organizations have constantly responded to the factors of increasing global competition, a changing workforce, complex work environments, and external pressures from governments, competitors, environmental groups, suppliers, and customers by changing the way in which they do business (Manz, 1992; Manz & Stewart, 1997; Walton, 1985). The responses to the need to change have had many names in the past few decades. There has been the total quality management (TQM) movement, business process reengineering, downsizing, right sizing, change management, organizational change, and many others. The response has been to implement change in order to address the internal and external factors that affect the business. Organizations hope that their change efforts lead to improvement and that improvement leads to competitive advantage.

There are many areas of an organization that can be improved. The daily operation of an organization is seen as a tangible area that can be easily improved through the use of technology. Organizations "are now aware that information technology is a great force for organizational change" (Eason, 1988, p. 4). Clearly, organizations did not consider the effects technology and technological change had on their personnel. Further, the organization's decision makers do not always consider how the changes in technology will affect work practices and the environment. Organizations must realize that a change in information systems can and does cause changes within other areas of the organization. The key to effectiveness for the organization is to succeed in its change efforts in information systems. Eason (2001) states, "the bigger and more expensive the [information systems] project, the more likely it is to fail" (p. 324).

According to Eason (1988), 40% of all information systems interventions fail. Wayt Gibbs (1994) explains, "some three quarters of all large systems are 'operating failures' that either do not function as intended or are not used at all" (p. 87). Scheer and Habermann (2000) have found that "empirical surveys have shown that between half and two-thirds of information systems projects fail" (p. 57). Soh, Kien, and Tay-Yap (2000) add that billions of dollars have been spent on these 'operating failures'. They explain that one reason for the expense is that "ERP implementation is more complex due to cross-module integration, data standardization, adoption of the underlying business model ('best practices'), compressed implementation schedule, and the involvement of a large number of stakeholders" (p. 47). All of these authors from 1988 to 2000 show that the failure rates for information technology can range from 40 to 75 percent. From an organization's perspective, this is a large waste of financial and human resources that results in not pursuing changes in their information systems. This non-pursuit has caused organizations to lose market share, suppliers, distributors, and future customers.

THE NEED FOR SOCIO-TECHNICAL SYSTEMS METHODOLOGY

What organizations need is an IS change methodology that takes into account the needs of the organization and its relationships. This methodology should account for the organization's internal and external environments, its work force, and its work practices. As organizations change technology, their environments, their people, and their work practices are affected (Appelbaum, 1997; Eason, 1988; Goodrum, Dorsey, & Schwen, 1994). Thus these authors argue organization change methodology should be based on socio-technical systems methodology.

The majority of organizations still only plan for the technical aspects of change. They do not see the advantage of planning a socio-technical system instead of just a technical system. Typically this shows that organizations have an inability in implementing integrated systems (Eason, 2001). Without considering how the technological change will affect both the employees of the organization and their jobs, the technological change planning team ignores any consequences the change will have on the culture of the organization. Using socio-technical systems methodology, an organization could design a change initiative that considers both the social aspects and the technical aspects of the organization (Appelbaum, 1997). It could also consider the environmental aspects that the change initiative will affect. Bijker (1995) explains that the information systems in the organization are socially constructed and the social aspects of the organization are technologically constructed (p. 273). This relationship between information systems and the social aspects of the organization is important to consider when implementing change. In order to do change successfully, organizations must realize the relationship and plan for it.

Social-technical Systems Methodology

An organization is an open system that can be defined as having at least three distinct sub-systems. As discussed earlier, there is both the social system and the technical system. However, there is also a third system that is as important to the organization as the first two. This system is the product system (work processes) that is comprised of all the jobs performed in the organization. Because of this third system, the organization is no longer divided in half, but thirds. However, one important component not considered earlier is the internal environment of the organization. The internal environment affects all three systems each day. Based upon this view of an organization, figure 1 shows the organization with its four internal components and its one external component.

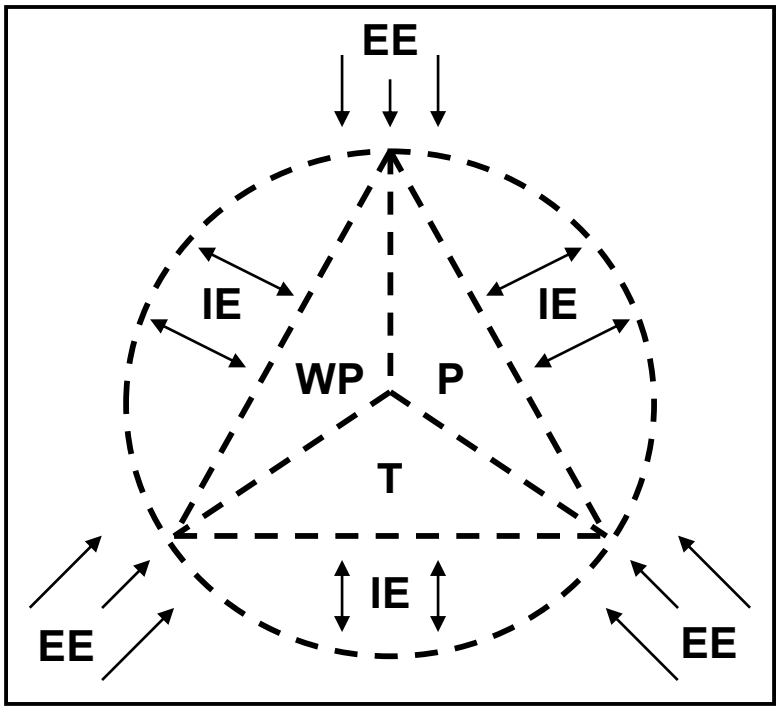

Figure 1. Socio-Technical Systems Diagram.

Notice that the organization is displayed as a dashed circle comprised of the internal environment, work processes, people, and technology components. The fifth component is the external environment outside the circle. All lines in the figure are dashed; this indicates that all five components affect one another. It also illustrates that the organization is an open system. A change in any of the five components will cause (or lead to) changes in the remaining four components.

The internal environment is the physical and cultural aspects of the organization including virtual environments, organizational values, and traditions. The external environment consists of the external forces that affect how the organization operates including its relationship to the community including environmental relations, social relations, goodwill, government regulations, the availability of a knowledgeable student body, and global market forces.

The people include the work and learning roles of each individual, the skills and knowledge that an individual possesses, the patterns of formal and informal communication, and the social relationships with one another. Work practices are the knowledge, skills, and routines for accomplishing specific tasks associated with the work and learning roles for each person in the organization. The technology consists of the technical computation, communication, multimedia, and information systems which support the other components.

STS methodology is an informed approach to improving organizations. This improvement can be made in any area, whether the social, technical, or product systems or the internal environment. Based upon this view, STS methodology can be applied to improve the overall competitive advantage of the organization (Pasmore, 1988).

Socio-Technical Systems Methodology Change Model

When an organization makes the decision to pursue redesigning itself, it must first choose the type of change model it is going to use to do the redesign. If the organization chooses to use socio-technical systems methodology redesign, it must have careful planning, widespread involvement, adequate resources, strong management support, and skillful facilitation (Pasmore, 1988, p. 109). An organization that achieves these items can pursue its redesign with confidence that it can reinvent itself into a more competitive and successful organization.

The organization that uses a socio-technical systems methodology model needs to realize that the process will not be a quick fix to organizational woes. The redesign can take anywhere from six months to three years to complete (p. 110). Based upon this understanding, the organization can achieve desired change by approaching the redesign with a realistic timetable. Organizations need to understand that the process cannot be rushed, but the organizations must invest the time needed to

produce the desired change that they want to achieve. The following is a diagram of the socio-technical systems methodology model.

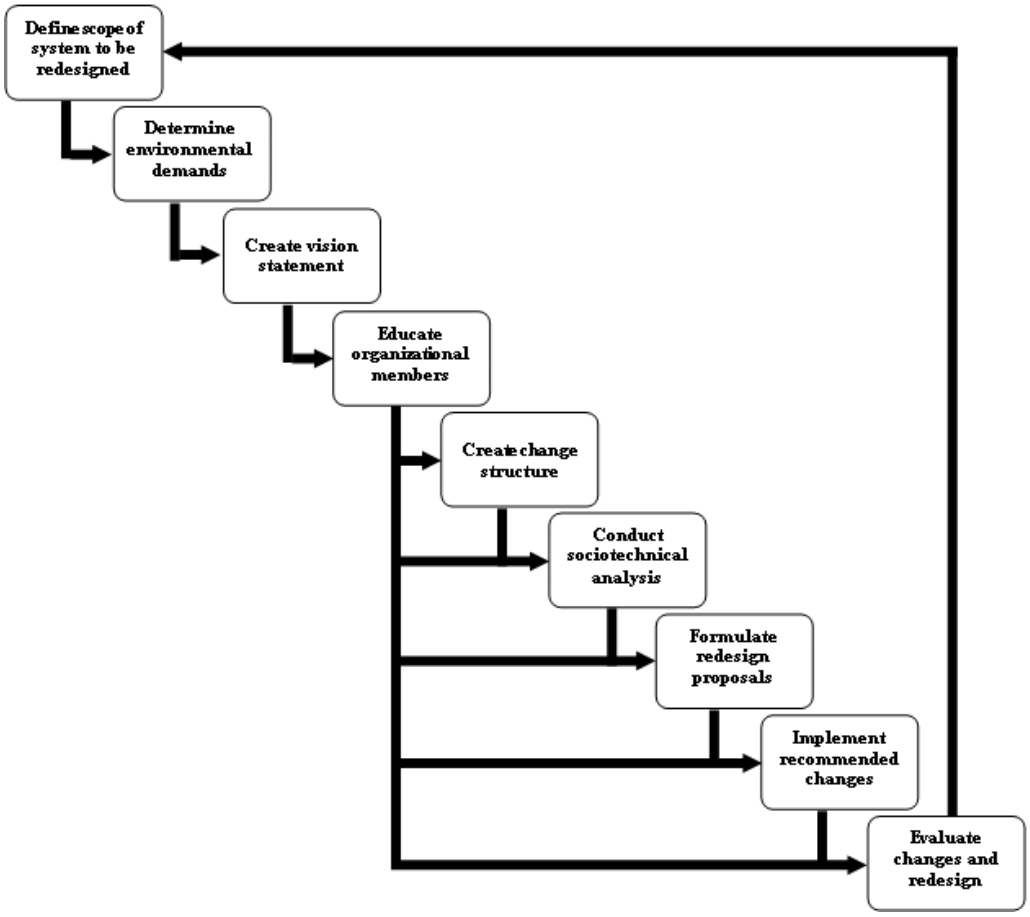

Figure 2. The STSM Change Model (based on Pasmore, 1988, p. 111)

THE CASE: SUCCESS OF PROJECT HOMESTEAD

Project Homestead was an endeavor that BCC undertook after an intensive analysis of various ERP software solutions. BCC's decision to implement SAP in the third quarter of 1995 changed the way that business was done at the global chemical company. Project Homestead began with an announcement by Black Chemical Company's Board of Directors during the fourth quarter of 1995. The announcement of the new ERP brought about a large amount of activity across the global chemical company. This implementation of Project Homestead was considered successful by various members of rollout teams, business systems employees, and Project Homestead's managers.

BCC began Project Homestead in 1996. The project brought BCC representatives from more than sixty different countries to represent their interests in developing the implementation methodology, implementing SAP, and pushing change across the global chemical company. The chemical packaging plants were represented by individuals who had an interest in ensuring that the information technology solution that had been chosen would benefit them as well. BCC hired IDS Ltd. to assist in developing the rollout methodology for SAP hopefully ensuring success in the project. All of these representatives worked on developing the initial SAP implementation software package and the implementation methodology. This mix of BCC associates, Black Chemical Packaging Company (BCPC) representatives, and Information Systems (IS) employees showed that BCC wanted all areas of its global operations represented on the project team. This representation also caused many constraints on the global solution of SAP for all of BCC and BCPC. These constraints consisted of trying to create one solution for all of BCC and its Strategic Business Units (SBUs).

BCC was very inexperienced with designing and implementing large software projects successfully. The CFO of BCC had already shifted IS from software development for the organization to buying applications off the shelf from software development firms. BCC wanted to make the organization more centralized with the ability of the CEO or any manager to

turn on a computer and see what any region was doing or how its packaging plants were performing. When an organization makes the decision to pursue redesigning itself, it must first choose the type of change model it is going to use to carry out the redesign. If the organization chooses to use socio-technical systems methodology redesign, it must have careful planning, widespread involvement, adequate resources, strong management support, and skillful facilitation (Pasmore, 1988, p. 109) to accomplish the complexity of redesign. The characteristics of socio-technical systems methodology can be found in the methodology that BCC used to implement its IT change. The methodology that was developed included seven phases for implementing Project Homestead across the organization. The seven phases and each phase's activities are listed below.

Phase 0: Strategic Alignment
- 0-1 – Project Management
- 0-2 – Business Readiness
- 0-3 – Business Process Validation
- 0-4 – Quality Assurance

Phase 1: Project Preparation
- 1-1 – Project Management
- 1-2 – Business Readiness
- 1-3 – Business Process Validation
- 1-4 – End User Training
- 1-5 – Project Team Training
- 1-6 – Standards
- 1-7 – Technical Infrastructure
- 1-8 – Testing
- 1-9 – Quality Assurance

Phase 2: Business Blueprint
- 2-1 – Business Readiness
- 2-2 – Business Process Validation
- 2-3 – Organizational SAP Structures
- 2-4 – End User Training
- 2-5 – Project Team Training
- 2-6 – Security Authorization
- 2-7 – Testing
- 2-8 – Standards
- 2-9 – Support
- 2-10 – Technical Infrastructure
- 2-11 – Quality Assurance
- 2-12 – Project Management

Phase 3: Realization
- 3-1 – Business Readiness
- 3-2 – Business Process Validation
- 3-3 – Configuration
- 3-4 – Cutover
- 3-5 – End User Training
- 3-6 – Project Team Training
- 3-7 – Security Authorization
- 3-8 – Testing
- 3-9 – Standards
- 3-10 – Support
- 3-11 – Technical Infrastructure
- 3-12 – Quality Assurance
- 3-13 – Project Management

Phase 4: Final Preparation
- 4-1 – Project Management
- 4-2 – Business Readiness
- 4-3 – Business Process Validation
- 4-4 – Cutover
- 4-5 – End User Training
- 4-6 – Security Authorization
- 4-7 – Testing
- 4-8 – Support
- 4-9 – Technical Infrastructure
- 4-10 – Quality Assurance

Phase 5: Go Live & Support
- 5-1 – Project Management
- 5-2 – Business Readiness
- 5-3 – Standards
- 5-4 – Support
- 5-5 – Technical Infrastructure
- 5-6 – Quality Assurance

Phase 6: Post Implementation Review
- 6-1 – Project Management
- 6-2 – Business Readiness
- 6-3 – End User Training
- 6-4 – Standards
- 6-5 – Support
- 6-6 – Quality Assurance

The methodology was developed from end-user studies for each particular implementation site.

The implementation of Project Homestead began very quickly. The implementations were started in Europe and spread through thirty-five countries. From 1999 to the end of 2002 approximately 85% of the organization received SAP. The year 2002 brought many changes to Project Homestead. The main change that occurred was a change in the implementation strategy of the methodology. In the past, BCC units had felt as if Project Homestead had been 'pushed' upon them. They believed that their IT needs were forfeited in place of Project Homestead. They believed that they had no voice. To make matters worse, the original Chairman whose vision was to have the ability to turn on a computer and to know what exactly was going on anywhere was no longer at BCC. This vision pointed to data analytics and how it could be used to improve the decision making of the organization. It allowed the Chairman to see a story. Unfortunately, the new Chairman had no real interest in Project Homestead.

CONCLUSION

The participants of this study, Project Homestead team members, shared their experiences of what occurred during their experiences on Project Homestead. They shared that they believed that the project was successful and that BCC's IT change methodology was in alignment with socio-technical systems methodology. However, the social system of socio-technical systems methodology seems to be lacking from BCC's change methodology. This is an important aspect to note since it

challenges Cherns (1978) and Trist and Bamforth's (1951) advice that employees should be included in the design of change initiatives.

Based upon the use of socio-technical systems methodology used to view BCC's change methodology, it is important for IS professionals to understand how to use socio-technical systems methodology when implementing change within an organization. Another area team members of Project Homestead pinpointed was the aspect of relationships within and outside BCC. This appeared to be an area that the change methodology did not address very well. There were executive level employees who voiced their disapproval of Project Homestead based upon the conclusion that SAP was going to change the internal and external relationships that BCC had spent years creating and maintaining. Although the team members of Project Homestead believed that BCC's change methodology aligned with socio-technical systems methodology, the social system of BCC was only marginally analyzed.

BCC is an organization that went through a technological change that has had lasting effects upon the global chemical company. The success of Project Homestead may be accounted to the implementation methodology having a close resemblance to socio-technical systems methodology. As BCC moved into the future with Project Homestead, the organization can compete based upon the information that is available due to standardizations that Project Homestead brought to the organization.

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