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Communications of the Association for Information Systems

THE WORK SYSTEM METHOD FOR UNDERSTANDING INFORMATION SYSTEMS AND INFORMATION SYSTEM RESEARCH

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ABSTRACT

The work system method is a broadly applicable set of ideas that use the concept of "work system" as the focal point for understanding, analyzing, and improving systems in organizations, whether or not IT is involved. The premises underlying this method may be controversial in the IS community because they imply that the traditional jargon and concerns of IS practitioners and researchers address only part of the issues that should be covered and may discourage focusing on other core issues related to successful projects and systems.

The work system method includes both a static view of a current (or proposed) system in operation and a dynamic view of how a system evolves over time through planned change and unplanned adaptations. The static view is based on the "work system framework," which identifies the basic elements for understanding and evaluating a work system. This framework is prescriptive enough to be useful in describing the system being studied, identifying problems and opportunities, describing possible changes, and tracing the likely impacts as those changes propagate to other parts of the system. The dynamic view is based on the "work system life cycle model," which shows how a work system may evolve through multiple iterations of four phases. The static and dynamic views are used together in a principle-based systems analysis method that treats the information system as part of the work system until a final step when it distinguishes between work system changes that do and do not involve the information system.

KEYWORDS: work system, information system, information system design, systems analysis, information system development, implementation, system life cycle

I. INTRODUCTION

The work system method is an approach for understanding and analyzing systems in organizations whether or not IT plays an essential role. This method is more broadly applicable than techniques designed to specify detailed software requirements and is designed to be more prescriptive and more powerful than domain-independent systems analysis methods such as soft system methodology. As explained elsewhere [Alter and Dennis, 2002], its development over the last decade stemmed from personal experience in the manufacturing software firm Consilium, some of whose customers and staff might have benefited from an organized method for seeing the relationship between software features and work practices.

The work system method combines a static view of a current or proposed system in operation and a dynamic view of how a system evolves over time. Table 1 defines basic terms underlying the work system method. The work system framework mentioned in Table 1 represents its static view. The work system life cycle model represents its dynamic view of how systems change over time through planned change and unplanned adaptations. The underlying ideas are discussed in an information systems textbook and a set of articles listed in the references. The present tutorial puts these ideas together and explains some of their implications for IS practice and IS research.

Table 1. Basic Terms Underlying the Work System Method

Basic Term	Definition
Work	Effort applied to accomplish something
Work system	A view of work as occurring through a purposeful system
Work system framework	Model for organizing an initial understanding of how a particular work system operates and what it accomplishes
Basic goals of a work system	Produce the desired results and perform the work efficiently.
Organization	Multiple work systems coordinated to accomplish goals that these work systems cannot accomplish individually
Business process	Work steps through which work is performed within a work system
Static view	How a work system operates, based on a particular configuration
Dynamic view	How a work system's configuration evolves over time through a combination of planned and unplanned change
Work system life cycle	Process through which a specific work system is created and changes over time through planned and unplanned changes.
Work system life cycle model	Model of a typical work system life cycle

The premises underlying the work system method may be controversial because they imply that traditional jargon and concerns of IS practitioners and researchers address only a subset of the issues that should be covered and may discourage focusing on other issues related to successful projects and systems. These premises include:

1. Relationship between work systems and the IS field: The concept of "work system" is a general case that encompasses information systems, projects, value chains, supply chains, and other special cases. Accordingly, the IS field should place substantial emphasis on work systems as a general case that could help in clarifying and organizing concepts and propositions about information systems, projects, and about the other special cases.

2. Inheritance of work system components and properties: As special cases of work systems, information systems and projects (and their own special cases) may inherit system elements, properties, and generalizations from work systems in general. If the inherited elements, properties, and generalizations constitute basic concepts and propositions about information systems and projects, the logical starting point for organizing these concepts and propositions should center on work systems, not information systems or projects per se.

3. Understanding information system goals and success: Information systems exist to support one or more work systems that may encompass none, part, or all of the information system. As information systems are increasingly integrated into work systems they support, it is increasingly difficult to separate information system success from work system success.

4. Applying general principles about work systems: A set of general principles related to work systems are the basis of a systems analysis method that business and IT professionals can use at whatever depth makes sense for them. With this type of method, business professionals might become more willing and able to analyze systems for themselves. Their enhanced ability to present their own views might help participatory design efforts live up to their name.

5. Work system life cycle model: A work system life cycle model that incorporates both planned change and unanticipated adaptations is useful in understanding the goals and desired results of information system projects. Typical project or information system life cycle models emphasize computerized capabilities and de-emphasize business and human realities. Inadequate attention to those realities may discourage the typical adaptations that occur in healthy work systems.

II. THE WORK SYSTEM FRAMEWORK

A work system is a system in which human participants and/or machines perform business processes using information, technologies, and other resources to produce products and/or services for internal or external customers. [Alter, 1999a] Typical business organizations have work systems to obtain materials from suppliers, produce and deliver end products, find customers, create financial reports, hire employees, coordinate work across departments, and perform many other functions. The term *work system* is used occasionally in the writings of socio-technical researchers but it is not clear from the publications I found whether most of these researchers defined the term carefully or used it consistently. [Alter and Dennis, 2002, footnote on p. 318]

Figure 1 is a graphical representation of a framework that can be used to summarize any work system and to serve as a focal point for analyzing a work system. [Alter, 2002a, as updated in Alter, 2002b] Each element in the framework should be included in even a superficial understanding of a specific system. The two-headed arrows between various elements reflect the importance of maintaining mutual alignment among these elements.

The trapezoid surrounding the business process, participants, information, and technology in Figure 1 indicates that those four elements constitute the system performing the work. In addition to these four internal elements, the work system framework also includes five other elements required for even a cursory understanding of a work system. The work system's outputs are the products and services received and used by its customers. Consideration of products, services, and customers even though they are not part of the system reflects the notion that a work system exists to produce things customers want. The surrounding environment and the available infrastructure are usually key determinants of whether a work system can operate as intended and can accomplish its goals. A work system's strategy and its relationship to the organization's strategy may or may not be explicit, but looking at strategies sometimes helps in explaining why the work system operates as it does.

Business processes. The work performed within the work system can be summarized in terms of one or more business processes whose steps may be defined tightly or may be relatively unstructured. Activities within each step include combinations of information processing, communication, sense making, decision making, thinking, and physical actions. As workplace researchers point out repeatedly, the actual operation of business processes often deviates from the idealized business processes that were originally designed or imagined. In addition, different participants may perform the same steps differently based on differences in skills, training, and incentives.

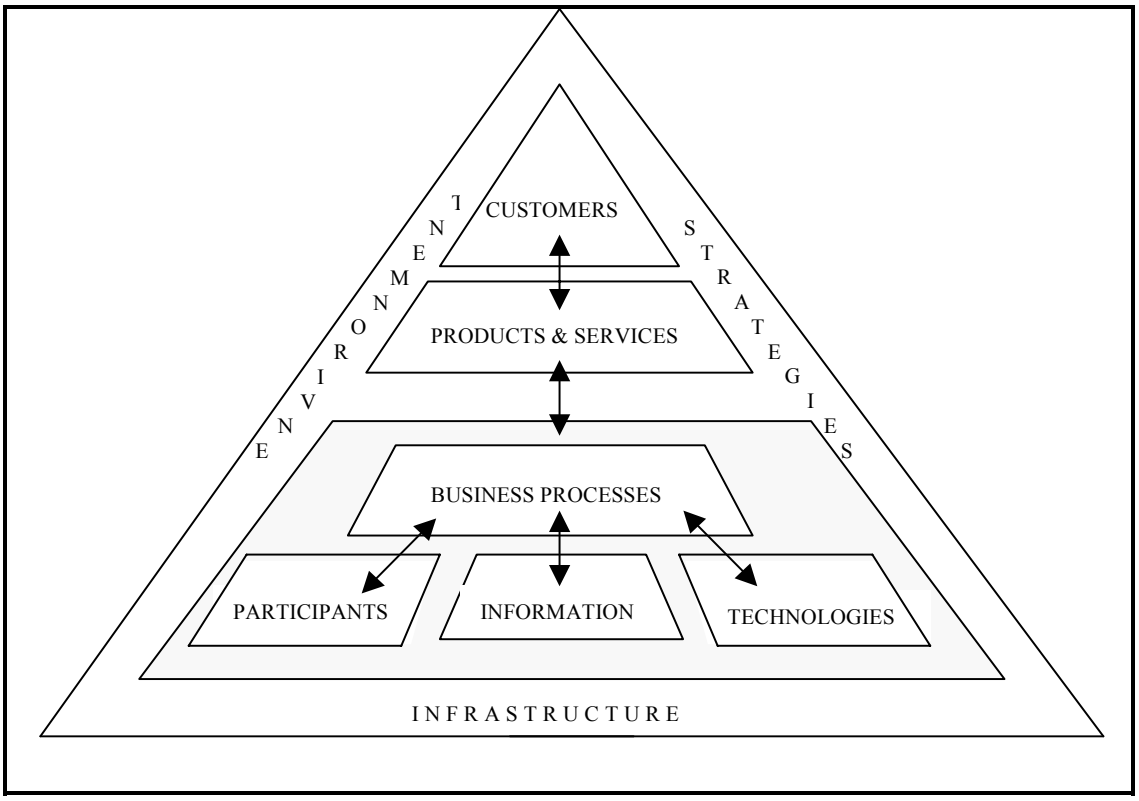

Figure 1. The Work System Framework

Participants. People who perform at least some of the work in the business process are the work system participants. Some may use computers and IT extensively, whereas others may use little or no technology. Whether or not particular participants happen to be technology users, when analyzing a work system the more encompassing role of participant is more important than the more limited role of technology user.

Information. Information includes codified and non-codified information used and created as participants perform their work. Either type of information may or may not be captured on a computer. The distinction between data and information is secondary when describing or analyzing a work system because data not related to the work system is not directly relevant.

Technologies. Technologies include tools (such as cell phones, projectors, spreadsheet software, and automobiles) and techniques (such as management by objectives, optimization, and remote tracking) that work system participants use while doing their work. Even when substantially computerized, specific tools (such as cars) and techniques (such as use of checklists) may or may not be associated with IT in a particular situation. Especially as adapted to fit a work system's peculiarities, technologies are viewed as integral parts of that work system and their affordances (such as a cell phone affording mobility) tend to be evident to system participants. In contrast, technical infrastructure includes technologies such as computer networks and programming technologies that are shared by other work systems and are often hidden or invisible to work system participants.

Customers. People who receive direct benefit from products and services the work system produces include external customers who receive the organization's products and/or services and

internal customers who are employees or contractors working inside the organization. According to the theory of Total Quality Management (TQM), a work system's customers are typically best able to evaluate its products and services. Customer satisfaction is often linked to the entire customer experience, starting from determining requirements and acquiring the products or services.

Products & services. Products and services are the combination of physical things, information, and services that the work system produces. They may include physical products, information products, services, intangibles such as enjoyment and peace of mind, and social products such as arrangements, agreements, and organizations. The terms products and services are used instead of "outputs" because that term brings too many mechanistic and computer-related connotations, especially when services and intangibles are involved.

Environment. Environment includes the organizational, cultural, competitive, technical, and regulatory environment within which the work system operates. These factors affect system performance even though the system does not rely on them directly in order to operate. The organization's general norms of behavior are part of its culture, whereas more specific behavioral norms and expectations about specific activities would typically be considered part of the business process.

Infrastructure. Infrastructure includes human, informational, and technical resources that the work system relies on even though these resources exist and are managed outside of it and are shared with other work systems. Infrastructure includes support and training staff, shared databases, and networks and programming technology.

Strategies. To the extent to which they are clearly articulated, the work system's strategy and the organization's strategy may help in explaining why the work system operates as it does. Examples of work system strategies include assembly line approach versus a case-manager approach and mass customization approach versus a commodity approach or a manually customized approach.

III. THE WORK SYSTEM LIFE CYCLE MODEL

Work systems exist in a particular form during a particular time interval. Changes in the work system's state may occur during that interval without significantly changing the work system's form. The work system life cycle (WSLC) model, shown in Figure 2 summarizes how a work system's form evolves through iterations combining planned and unplanned change. In planned change, human, monetary, and technical resources are allocated to a visible project (with initiation, development, and implementation stages) whose goal is to change the system's form. In unplanned change, minor adaptations lead to further adaptations usually accomplished without major projects or major allocation of resources.

The first version of the WSLC model appeared in the first edition of my textbook and was designed as a common denominator for custom development, use of application packages, prototyping, end user computing, and other ways to build information systems. The names of the four phases were chosen to apply to non-computerized systems as well. Alter [2001b] presented an extended version that included iterations, and demonstrated that model's generality by showing how it encompassed over a dozen models in the IS literature. The revised version in Figure 2 adds explicit recognition of unanticipated opportunities and unanticipated adaptations, thereby recognizing the importance of diffusion of innovation, experimentation, adaptation, emergent change, path dependence, windows of opportunity, and assimilation gaps. (e.g., [Rogers, 1983]; [Tyre and Orlikowski, 1994];[Orlikowski and Hofman,1997]; [Gallivan, 2001], [Fichman and Kemerer, 1999]) Inclusion of these factors is at least partly inconsistent with project-oriented viewpoints, which often treat unanticipated opportunities and adaptations as problems rather than opportunities and categorize them under pejorative headings such as

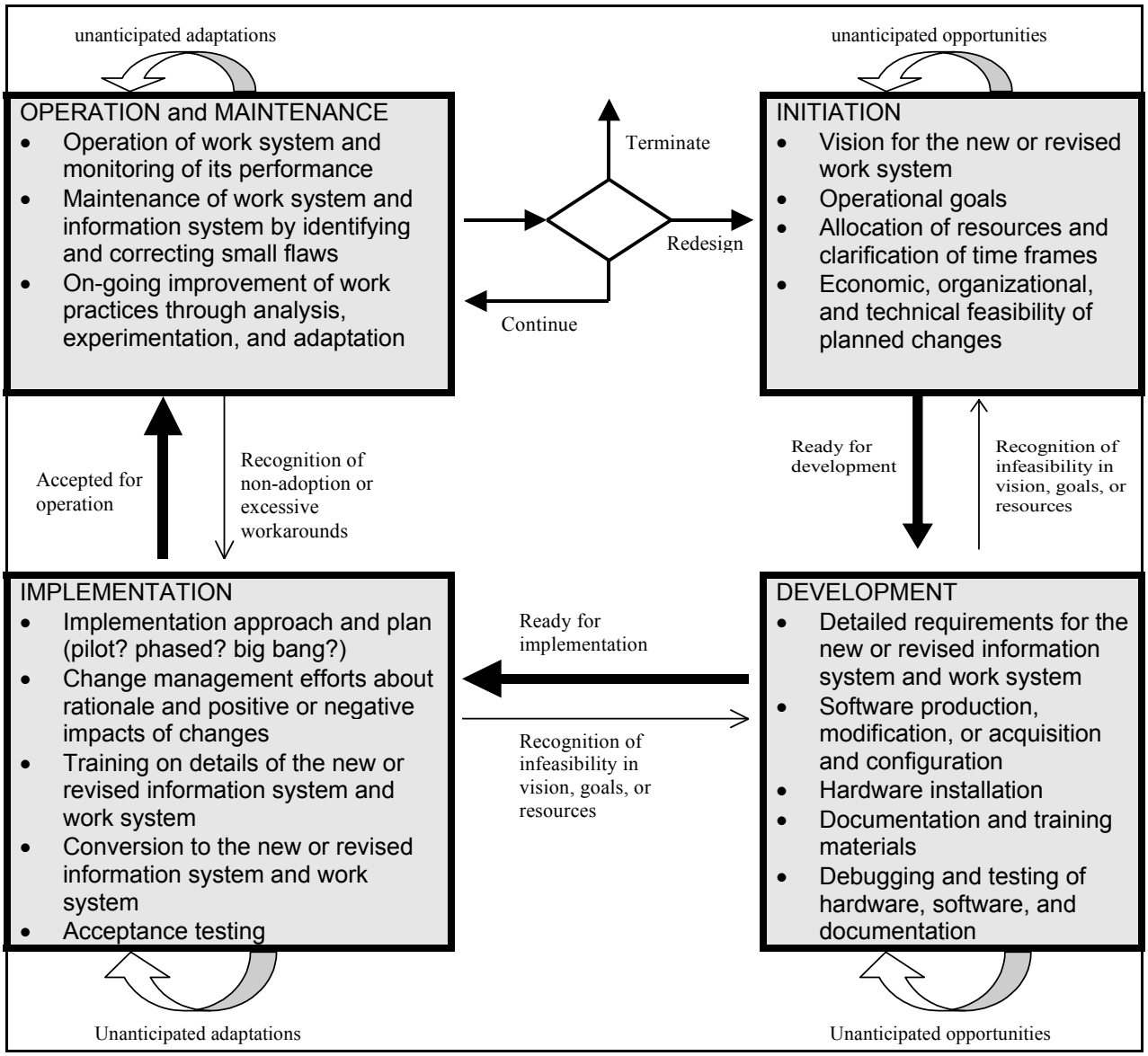

Figure 2. The Work System Life Cycle Model

"requirements creep" and nonconformance. Although uncontrolled projects involve many obvious problems, over-controlled projects and systems may assign higher priority to project schedules and system consistency than to business benefits and system effectiveness. Related tradeoffs occur in any significant project or system and should not be ignored or automatically treated as undesirable by a life cycle model.

IV. INFORMATION SYSTEMS AND WORK SYSTEMS

Information systems constitute a special case of work systems in which the business processes performed and products and services produced are devoted to information. The activities in their business processes are limited to six types of computerized or manual activities:

- capturing information
- transmitting information
- storing information
- retrieving information
- manipulating information
- displaying information.

Examples of information systems include tracking systems used by package delivery companies, medical reimbursement systems used by insurance companies and governments, and architectural design systems used by architecture firms. Participants in these information systems perform or trigger information processing activities while also participating in larger work systems (delivering packages, providing reimbursements, designing buildings). In addition to information processing, activities in those larger work systems include communication, sense making, decision making, thinking, and physical actions.

Projects, value chains, and supply chains are also work systems. A project is a time-limited work system designed to produce something and then go out of existence. A supply chain is a work system devoted to procuring materials and other resources a firm needs in order to produce products and services for its external customers. A value chain is a work system consisting of a set of smaller work systems that combine to produce whatever value the external customer receives.

OVERLAP BETWEEN WORK SYSTEMS AND INFORMATION SYSTEMS

Information systems typically exist to support other work systems that may or may not be information systems. The distinction between an information system and the work systems it serves is important because there are many possible relationships and forms of overlap between the information system (IS) and the work system (WS). These include [Alter et al, 2001]:

- Comparatively small IS provides information for a WS but is not part of it. Example: An IS that collects production data and creates a file of production data later used by the accounting department.

- Comparatively small IS is a dedicated component of a WS. Example: A real time dispatching system that helps manufacturing workers decide which lot to process next in a factory.

- WS is primarily devoted to processing information and the IS and WS are almost identical. Examples: billing system, payroll system, loan approval system.

- One IS overlaps with several separate WSs. Example: An IS for sales call tracking might be used by the sales force for tracking sales progress and by the finance department for financial projections.

- A large IS supports various WSs and might be larger than any of them. Example: An airline reservation system used for deciding what flights to take, booking reservations, making yield management decisions about overbooking flights, and analyzing frequent flyer promotions.

The process of designing an IS or WS it supports should depend on the degree of overlap between the two systems. For example, if a WS is largely an IS, the design of the WS would largely be an IS design effort. On the other hand, separate design might be more effective for a WS and a related IS whose business processes overlap minimally or not at all.

As information systems become more integrated with work systems, the entire topic of evaluating information systems and their impact becomes more problematic. On the one hand, important aspects of the work system cannot operate without the information system. On the other hand, the work system may include decision making, communication, negotiations, physical activities,

and many other activities that are outside of the information system even if they may be influenced by it. Under these increasingly common circumstances, the success of a work system depends on the operation of the information system and on other factors not related to the information system. As represented in Figure 3, studying the success of information systems without evaluating the success of related work systems is increasingly like intentionally setting out to study only one of a pair of Siamese twins. [Alter, 1999b]

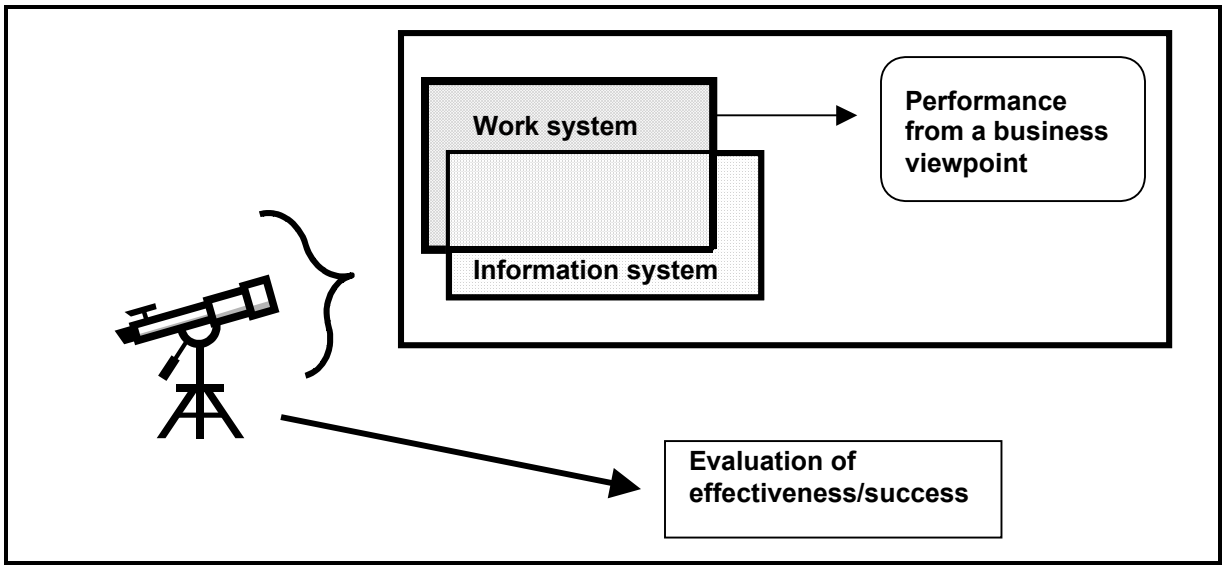

Figure 3. Cause of Increasing Difficulty in Assessing Information System Success

INHERITANCE OF WORK SYSTEM CONCEPTS AND SUCCESS FACTORS

That information systems, projects, supply chains, and value chains can all be characterized as work systems implies that vocabulary and concepts that apply to work systems in general also apply to these special cases. Although the special cases also have their own unique vocabulary, it is possible that a large majority of the core concepts related to information systems and projects are actually concepts related to work systems and are best understood at that level. [Alter, 2001a]

Figure 4 goes a step further by illustrating the hypothesis that generalizations and success factors related to work systems in general are inherited by special cases such as information systems and projects. [Alter, 2002a, p. 59] Inheriting success factors from the general case in no way precludes the existence of additional success factors based on issues relevant to each special case but not to work systems in general. Similarly, specific types of information systems and projects should inherit success factors for information systems and projects, respectively, but might have additional success factors related to their defining attributes. For example, the success factors for an expert system or for an ERP project should include:

- some success factors for work systems in general, such as management support, commitment, participant incentives aligned with system goals, adequate training, and adequate resources

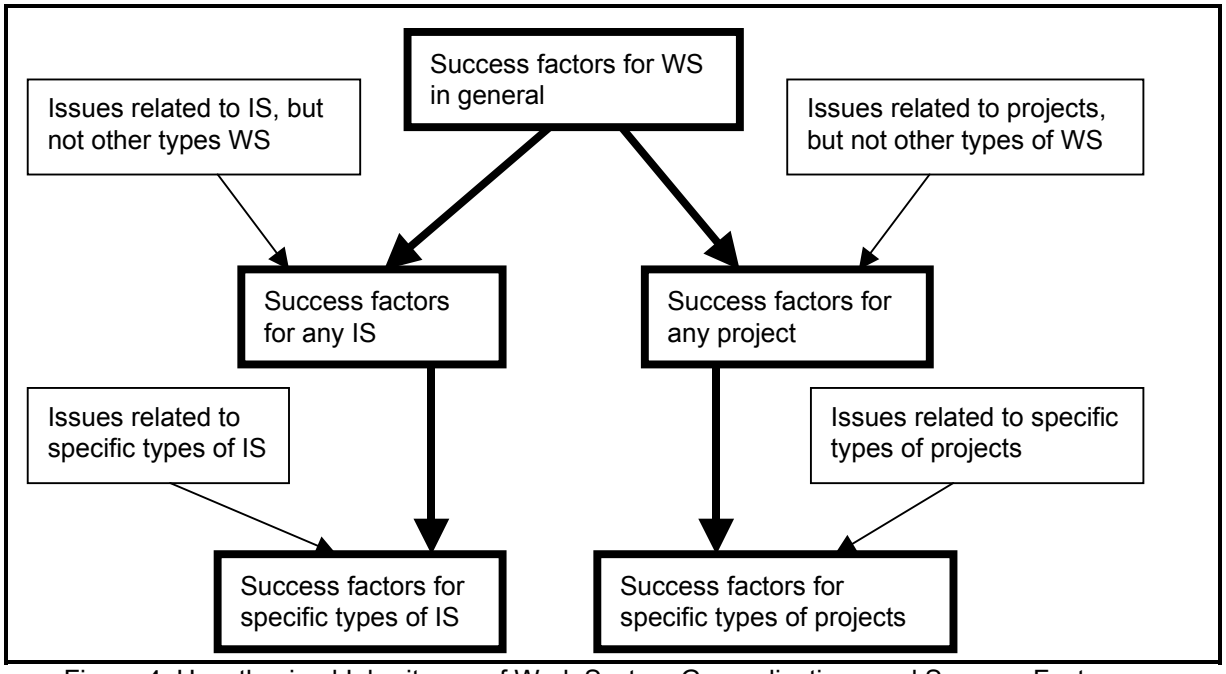

Figure 4. Hypothesized Inheritance of Work System Generalizations and Success Factors

- additional success factors related to information systems and projects, respectively, such as prior experience with related information systems or careful project management

- additional success factors related to the particular types of information system and project, such as cooperation between the knowledge provider and knowledge engineer or extensive involvement of experienced ERP consultants.

The inheritance relationships expressed in Figure 4 may explain why studies about different types of information systems and projects frequently produce overlapping success factors and generalizations. The most common success factors and generalizations typically concern work systems in general rather than the special cases.

V. ANALYZING A WORK SYSTEM FROM A BUSINESS VIEWPOINT

Assume that business and/or IT professionals want to analyze a system to solve a problem or exploit an opportunity. Unless the problem is only about technical aspects of IS hardware or software, work system concepts are useful in organizing the analysis.

- First, define the work system and the problem or opportunity.

- Then explore the work system elements in turn to identify possible improvements and to reveal additional problems not considered initially.

- After identifying the possibilities, decide how to address the problem or opportunity without creating even worse problems.

- Use the fundamental concepts of work systems, information systems, and projects as the basic vocabulary for the analysis. [Alter, 2002a]

These steps sound logical and straightforward, but even a brief overview of the steps and related pitfalls helps in identifying confusions and communication lapses that affect system-related results in many organizations.

Define the problem and work system. The first step in analyzing any system is to define it. MBA and EMBA students analyzing real world systems in their organizations consistently report significant difficulty in deciding exactly what system they are studying. Common pitfalls related to defining systems include:

- The system is never defined clearly. A common result is meetings in which some people think a system under discussion, such as a manufacturing system, is the way the company performs a particular type of work, whereas others think the system being discussed is the software or information system that supports the work.

- The system to be improved is assumed to be the software or the technology. This assumption limits the likely improvements to aspects of the software or technology rather than other aspects of the work system that might be changed more easily than software or that might be so resistant to change that software improvements would be of little impact.

- The system definition is too broad or too narrow. If it is too broad, the analysis will cover too much territory and will be unnecessarily complicated. If it is too narrow, the analysis might be easier but might produce an inconsequential result.

- The problem definition is vague. At minimum, a clear problem definition simplifies the analysis by focusing on the smallest system that exhibits the problem. In addition, a vague problem definition makes it difficult to assess the quality of the recommendation.

As applied to analyzing a system, the work system method starts by identifying a set of problems or opportunities and by defining the smallest work system whose operation contains those problems or opportunities. For example, if the problem involves disappointing sales revenue, the work system may be viewed as all sales activities or just a part of the sales work that is being done poorly.

A useful tool for clarifying the scope of the work system is a "work system snapshot." [Alter, 2002a, 2002b] This snapshot is a single page or less that identifies the customers, products and services, and participants, lists the business processes as no more than ten steps in total, and gives a brief indication of the most important information and technologies in the work system. Even when there is initial agreement about the work system snapshot, looking at the situation in more depth as the analysis unfolds often results in revising the initial assumptions about the work system's scope. The definition of the problem and system should also include constraints, priorities, and system strengths that should be maintained.

Explore the situation and search for possible improvements. After defining the system and the problem or opportunity, the next step is to design and evaluate alternative ways to produce improvements. Common pitfalls in this exploratory phase include:

- Too often the "analysis" leaps from the problem to a solution without considering possible improvements and additional problems that even a superficial exploration would reveal. When I compare this method to "Ready, Fire, Aim" in an EMBA class, someone typically pipes up with "We do that. We just did a major project without ever figuring out how the software changes would change the business process or affect system participants."

- Especially when IT professionals are involved, the analysis may tend to emphasize computerized tasks and may assume that recommendations should emphasize that area.

In many cases other issues such as inappropriate incentives, inappropriate business process characteristics, and organizational issues are just as important.

The work system method calls for using general principles to help in identifying current shortcomings or new problems that might emerge if a particular change is pursued. One version of these principles and the related work system elements is as follows:

Principle	Related Work System Element
#1: Please the customers.	Customers, Products & Services
#2: Perform the work efficiently.	Business Process
#3: Serve the participants.	Participants
#4: Create value from information.	Information
#5: Minimize effort consumed by technology	Technology
#6: Take full advantage of infrastructure.	Infrastructure
#7: Minimize unintended conflicts and risks.	Environment
#8: Support the firm's strategy	Strategy
#9 Maintain balance between work system elements	All elements in combination

To explore the situation and search for possible improvements, the work system method calls for looking at each principle (in any order) and thinking about the relevant characteristics, performance variables, and other topics that provide a direction for clarifying the current situation and describing plausible alternatives. For example, when looking at the business process using the principle "perform the work efficiently," the inquiry might proceed along several directions. One might look for ways to eliminate shortcomings in individual steps in the process. One might look at big picture characteristics of the business process, such as its degree of structure, range of involvement, complexity, rhythm, and so on. Thinking about incremental changes in these characteristics might lead to insights. Similarly, looking at performance variables such as activity rate, consistency, and cycle time might lead to insights about how the business process could be improved.

Very few work systems actually satisfy all of these principles, partly because the principles are often contradictory. For example, the principle of pleasing the customers often contradicts the principle of doing the work efficiently (because customers are most concerned about the products and services they receive and may not care how efficiently the work is done). This principle may also contradict other principles such as serving the participants (because customers may not care about the conditions under which the participants work) and minimizing effort consumed by technology (because customers may not care about work system efficiency). The internal contradictions between the principles demonstrate why it is difficult to design work system changes that are improvements from every viewpoint.

Produce recommendations. Ideally the recommendations should address the problem in a manner that generates improvements without generating too many new problems. Common pitfalls in producing recommendations related to systems include:

- Producing recommendations about how the software or information system should change while ignoring or downplaying complementary work system changes required for effective information system operation and work system success.

- Regardless of what analysis was performed, treating the problem as a technical problem that requires a technical recommendation that may ignore or downplay personal, social, organizational, and cultural issues.

- Ignoring the possibility that changes in one part of a work system may cause new problems in another part of a work system or in a related work system.

- Producing recommendations without thorough consideration of the effort and disruption required for implementing the new or modified system in the organization.

To avoid these pitfalls, even a minimal recommendation should include at least the following:

- Proposed changes in each element of the work system

- Clarification of which changes involve just the work system, just the information system, or both the information system and the work system

- Explanation of how the proposed improvements will address the original problem and the other problems discovered in the analysis

- Identification of meaningful alternatives that were not chosen and why these were deemed less beneficial than the recommended alternatives

- Identification of important stakeholder interests, whether and how these will benefit from the proposed change, and implications for successful implementation

- Tentative project plan including timing and deliverables

This steps described are just the beginning of the analysis required to build or significantly improve a computerized system. In terms of the WSLC, this analysis should occur in the initiation phase, and its results should be verified and extended in the detailed analysis in the development phase.

VI. IMPLICATIONS FOR RESEARCH AND PRACTICE

The work system method is based on the possibly counterintuitive assertion that the best way to understand information systems in organizations is to avoid focusing on the information system until the work system is understood. This assertion applies to both IS practice and IS research.

IS Practice. Poor communication and difficulty establishing clear expectations frequently contribute to the appalling rate of disappointment and failure of IS projects. The work system method addresses these problems by providing a business-oriented vocabulary and an organized method that business professionals can use at whatever level of depth makes sense to them. The combination of the work system framework and work system life cycle model provides a basis for communicating about systems and system-related projects. These ideas encourage business and IT professionals to adopt a business- and organization-oriented view that cannot ignore concerns of business professionals whose participation and commitment is often essential for system and project success. These ideas are also a step toward genuinely participatory design because they give business professionals an organized but not excessively rigorous method that they can use at any level of detail to explore their view of a situation without being pushed into analytical frameworks designed to generate software specifications.

IS Research. Most important work systems in today's organizations rely on computerized information systems. These work systems combine activities that may or may not involve processing information and may or may not be supported by IT. Under these circumstances, it simply doesn't make sense to create an artificial boundary between IS research and WS

research. As anyone involved in a major implementation or reengineering project surely realizes, maximizing the value and long-term impact of the IS field requires recognizing explicitly that it should or already does encompass aspects of work systems that may or may not involve IT directly.

Implications of the work system approach for understanding the meaning of IS research are more problematic. Assume that someone has done research about expert systems, MIS, or another special case. Were the findings really about expert systems or MIS, or were they really about information systems or work systems in general? Of course the immediate findings were about whatever the sample actually represented, but where do the findings belong in the accumulated knowledge of the IS field? For example, if a study of expert systems finds that management support is important, it seems at best uneconomical to place that finding in expert system folder when it already exists in the MIS folder, the IS folder, the WS folder, and many other folders. The inheritance relationships shown in Figure 4 may provide an effective way to reduce the redundancy by associating the generalization about management support with the most general type of work system to which it applies. Doing that would facilitate the progress of the IS field by clarifying what we think we know and placing it at the most useful level. At minimum the attempt to codify IS-related knowledge in this way would help reveal what we think we know.

Next steps. The work system method is the result to date of an effort to develop a systems analysis method that business professionals can use in whatever level of detail makes sense for them. The test bed has been MBA and EMBA classes at the University of San Francisco. The next step is to test whether this approach facilitates understanding by business professionals and better communication between business and IT professionals. In addition, it would be interesting to compare the relative effectiveness of the work system method and other methods in the literature, such as soft system methodology [Checkland, [1993], [Checkland and Scholes, 1990], the "thinking process" proposed by Goldratt as an extension of the theory of constraints [Dettmer, 2000], and the systems analysis methods discussed in current textbooks for IS majors.

Another important direction is to verify the inheritance relationships in Figure 4 by developing an ontology of the IS field that covers the elements of a work system and related properties. Ideally, this ontology should be tested by determining whether the propositions and findings in the IS literature can be stated using the terms in the ontology. The guiding metaphor for this effort is "Sysperanto," not really a language, but rather, an organized set of core concepts that business professionals, IT professionals, and IS researchers might use for describing, understanding, and analyzing systems in organizations. If successful, Sysperanto might help in codifying and organizing the disparate and inconsistent propositions, methods, and findings that constitute the current state of knowledge in the IS field. [Alter, 2002c]

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EDITOR'S NOTE: The following reference list contains the address of World Wide Web pages. Readers who have the ability to access the Web directly from their computer or are reading the paper on the Web, can gain direct access to these references. Readers are warned, however, that
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