Communications of the Association for Information Systems

Volume 26 Article 11

3-2010

Viewing Systems as Services: A Fresh Approach in the IS Field

Steven Alter
University of San Francisco, alter@usfca.edu

Communications of the Association for Information Systems

CAIS

Viewing Systems as Services: A Fresh Approach in the IS Field

Steven Alter

University of San Francisco

alter@usfca.edu

Abstract:

Despite wide agreement that we are in a service-dominated economy, there has been little movement toward treating service and service metaphors as core aspects of the IS field. This tutorial proposes that viewing systems as services is a potentially fruitful but generally unexplored approach for thinking about systems in organizations, systems analysis, and numerous applications of IT. An extension of past research in several areas, viewing systems as services proves to be an umbrella for developing new systems analysis and design methods, improving business/IT communication, and finding practical paths toward greater relevance and significance in business and society.

Keywords: service, service system, systems analysis, work system, value chain, coproduction, service value chain, service responsibility table

Volume 26, Article 11, pp. 195-224, March 2010

Editor's note: The article is based on a tutorial presented at the Americas Conference on Information Systems, August 2009, San Francisco, California.

I. THE ALLURE OF SERVICES IN THE IS FIELD

In an editorial in *Information Systems Research*, Rai and Sambamurthy [2006] note implications of the extensive and widely recognized transformation toward a services economy for "research and teaching opportunities for IS scholars in the domain of digitized services innovation, management, and use." They provide a lengthy list of opportunities for IS scholars, including, among many others, service-oriented architectures, event management, synchronous and asynchronous interactions, modular design principles, customer perceptions, economics of digitally enabled services, sourcing of services, development and evaluation of new models for service coproduction and innovation, management of the total customer experience, and IT services management frameworks such as ITIL (Information Technology Infrastructure Library).

Part of the relevant context is a concerted effort by IBM and other leading technology companies to develop a science of services [Chesbrough and Spohrer, 2006; Spohrer et al., 2007] and university degree programs in SSME (service science, management, and engineering). A key reason for their interest in these topics is that over 50 percent of the revenue of software companies and almost 40 percent of the revenue of IT hardware companies come from services [Wood, 2007].

Another relevant part of the context is that greater attention to service concepts and metaphors might help in addressing the long-standing problem of inadequate user engagement and inadequate business/IT alignment. The language of service should help IT groups engage and communicate with the business professionals, managers, and executives they hope to serve. Relatively more use of the language of service and relatively less use of the language of technology facilitates communication and understanding related to business and organizational issues.

Thus, viewing systems as services is beneficial in a number of ways:

- It helps the IS field capture and exploit more of today's pervasive interest in services and the service economy.
- It helps in focusing on the business value of IT because services comprise nearly 75 percent of the entire U.S. economy [Horn, 2005], and because most internally directed systems within organizations basically perform services for other parts of the organization.
- It improves the extent and quality of user participation because issues and details about services are easier to discuss than issues and details about what business professionals perceive as technical artifacts. In particular, the vocabulary of services would help point the discussion toward business issues.
- It enriches systems analysis methods by introducing concepts that otherwise would be ignored or considered outside the legitimate scope of the analysis.

Toward Coherence or Toward More Divergence?

Although service-related topics currently receive more attention than they once received, a direction for more pervasive engagement with services by the IS field is not obvious in either form or content. In relation to the ongoing debate about the coherence of the IS field [Robey, 1996; Benbasat and Zmud, 2003; King and Lyytinen, 2005], greater attention to the various topics under the general umbrella of service might broaden the IS field by encouraging IS researchers delve into a wider range of topics. For example, when members of the AIS community met at ICIS 2007 to discuss the possibility of creating a special interest group (SIG) for services, interests of attendees covered a vast range of topics such as those listed in Table 1.

On the other hand, it is not clear why the various service terms in the first column of Table 1 really belong together and where these topics fit as a whole in the IS field. The only obvious commonality across the diverse set of terms in the first column of Table 1 is that each term includes the word *service*. For example, it is conceivable that SOA and service computing would not have been in the same table as human-intensive services if whoever coined the computer science term *client-server* had instead coined the term requester-responder. In that case, we might be speaking of RROA, request-response computing, and web responders instead of SOA, service computing, and web services. In other words, the combination of service-related terms in Table 1 seems to be based partly on an accident of language rather than on a substantive link between genuinely related ideas.

Table 1: Typical Areas of Interest Related to Services Within the IS Field	
Area of interest	**Comment or example**
Impact of IT on service economies	Motivated by the shift of the economy of First World countries from agriculture to manufacturing
Human-intensive services for people and organizations	Examples: medical service, transportation, phone service, software development, data center management, and customer service in retail and manufacturing organizations
Services provided by IT organizations	Numerous services are codified by ITIL, the Information Technology Library (Wikipedia, 2008b) and other similar bodies of knowledge
Software as a service	Providing commercial software by licensing it to a customer and maintaining and operating it on vendor servers instead of the customer's servers
Service oriented architecture (SOA)	A programming architecture that packages software as interoperable services, thereby making it easier to build software systems out of modules that may have been programmed at different times for different purposes and perhaps somewhat inconsistent internal designs
Service computing	A form of software and hardware architecture in which responsibilities are divided between client and server roles
Web services	Web-based software applications that can be accessed and used by other web-based software applications.

Thinking of systems as services takes a cue from Vargo and Lusch's widely discussed proposal that the marketing field might replace its traditional goods-dominant logic with what they call service-dominant logic. Vargo and Lusch [2004a] propose eight foundational premises that are highly abstract and in some cases controversial. This paper's ideas about systems as services are related to several of their premises, but are not about replacing one form of logic with another as Lusch and Vargo propose to do. Instead, this paper shows how ideas related to services can be incorporated into the existing IS field and can enrich current approaches within the field.

Organization of this Tutorial

After defining the term *system* (Section II) the paper defines the term *service* (Section III) using a simple, general definition that is not encumbered by characteristics that apply to some services but not others. Next it discusses the following five steps toward deeper, more pervasive use of service metaphors in the IS field:

- Think of systems as service systems (Section IV).
- Recognize that the value from services tends to be coproduced by providers and customers (Section V).
- Recognize the significance of service-related design dimensions (Section VI).
- Recognize how service systems change and evolve (Section VII).
- Incorporate service-related concepts and tools into the evaluation, analysis, and design of systems (Section VIII).

The explanation of the fifth step in Section VIII identifies a set of tools that can help in making broadly applicable service concepts visible in systems analysis, which links to most of the core concerns of the IS field. There is no claim that these are the only possible tools for this purpose. Instead, these tools should be viewed as illustrative examples showing that the metaphor of systems as services is potentially useful and should be incorporated into the analysis and design of systems in organizations. A final section on implications and conclusions discusses a number of ways in which viewing systems as services could enrich the IS field.

II. DEFINITION OF SYSTEM

The term *system* has many dictionary meanings, including a combination of things or parts forming a complex or unitary whole (e.g., a mountain system or a railroad system), a coordinated body of methods or a scheme or plan of procedure (e.g, a system or government), and a formulated, regular, or special method or plan of procedure (e.g., a system of numbering) [www.dictionary.com, 2008]. Within these definitions, all of the following can be considered systems: a computer program, a software suite, an information system, a physical supply chain, an organization, and a national economy.

Within the IS field, saying that a system is a combination of parts generates no new insights. It is more useful to say that a system is a consciously designed combination of things or parts that perform useful work. The latter definition is potentially useful for IS because it limits the discussion to artificial systems whose form and operation are not accidental and because it leads toward identifying the parts and describing the work that is performed.

Several additional points about the definition of system and the application of a system perspective are worth mentioning.

- Systems are an expression of an observer's viewpoint and do not have independent, verifiable existence (Checkland 1999).
- A systems perspective treats a system as a way of viewing interrelated things in the world rather than as a concrete, fully specified, independent entity.
- The system is defined based on the purposes of the analysis.
- A "fundamental limitation of any modeling of a system [is] that the system is always embedded in a larger system" [Churchman, 1979, p. 76]. This is one of the reasons why it is often not obvious where to place the boundaries of a socio-technical system.

Much of the value of system-related ideas in the IS field involves their use in system thinking. Table 2 clarifies the nature of systems thinking by comparing a tool view of IS with a system view of IS [Alter, 2004]. With a tool-centric view, the headline is the tool that is being used. In contrast, a system view focuses on a system of doing something. With a tool view, people are users of the tool, whereas with a system view people are participants in the system.

In its discussion of viewing systems as services, this tutorial focuses primarily on socio-technical systems that are best understood through the type of system view that is characterized in Table 2. Highly automated instances of these systems can also be understood using a tool view, as will be discussed briefly in Section IX after the broader ideas about socio-technical systems are explained.

III. DEFINITION OF SERVICE

Researchers in marketing, operations, and computer science have discussed and analyzed services from vastly different viewpoints in recent years. Rai and Sambamurthy [2006] recognize that "a common definition has not emerged within or across fields." They list four definitions (the first four of the seven in Table 3) and say, "in general, the definitions emphasize a simultaneous or near-simultaneous exchange of production and consumption, transformation in the experience and value that customers receive from engagement with providers, and intangibility in that goods are not exchanged."

In reality, many service situations don't fit the definitions in Table 3. Consider a complex software product that was custom-designed and custom-built. This is a service example because the situation involves work done by one group of people for the benefit of others. Building the software may have absorbed months of time, involved a great of effort not related to customer interactions or customer experiences, and produced things that are not totally intangible (e.g., specific sets of documented instructions) and may not be defined or agreed in advance. Similar examples are given by Vargo and Lusch [2004b] to argue that four prototypical characteristics often believed to distinguish services from goods—intangibility, inseparability, heterogeneity, and perishability—"(a) do not distinguish services from goods, (b) only have meaning from a manufacturing perspective, and (c) imply inappropriate normative strategies."

Service by people or machines? Defining services in the IS field adds another wrinkle because services are provided by people and by computers. Researchers and practitioners in marketing and operations assume that services involve human service providers and human service consumers, both of whom may use IT while performing or receiving the service. The quality of interactions between service providers and service consumers is usually considered quite important, and often viewed as the essence of service, e.g., Carlzon's [1989] term "moments of

truth" and Teboul's [2006] book *Service is Front Stage*. Within that view of service, the provider's ability to recognize and respond to the consumer's stated or unstated needs, interests, and concerns is an important aspect of service quality.

Table 2: Comparing a "Tool View" with a "System View" of Information Systems

	Tool view of an information system	**System view of an information system**
Headline	The tool that is used	The system of performing purposeful work
Role of people	Users of the tool	Participants within the system or customers of the system
Information	Whatever information is stored or processed by the tool	Whatever codified or non-codified information is produced or used by the system
Technology	The tool is the technology or is a part of the technology.	The system may use a variety of technologies that may or may not involve IT.
Customers	Users of the tool or whatever the tool produces	People (or other entities) who receive and use whatever the system produces
Performance variables related to operation	Measure how well the tool operates and how well it is used. Metrics include user satisfaction, uptime, energy usage, and ease of use.	Measure how well the system operates internally and how good are the products and services it produces for customers
Life cycle model	A project-oriented model related to defining, creating or acquiring, and installing a tool.	A model oriented toward business operations, whereby an operational system is created and then evolves through a series of iterations of system in operation, initiation of changes, development efforts, and implementation of changes in the organization.
Ownership	A tool may be owned by the organization that uses it or by an organization that controls tools or provides shared infrastructure.	A system is owned or co-owned by an organization whose work it performs. (In outsourcing, that work may be performed for another organization.)
Performance measures related to change	In a new setting, measure the tool's diffusion and acceptance. In a setting where the tool is already used, measure the tool's usefulness, success, and cost/ effectiveness.	For a new system that is being created, measure the implementation effort and extent to which the system is institutionalized in its originally desired form. For an existing system, measure the effort involved in defining, implementing, and stabilizing a change.
Main issues in analysis and design	Produce a tool that meets requirements in a cost effective manner, is installed successfully, and is used as intended.	Create or improve a socio-technical system, assuming that technical and social issues may be intertwined.

Table 3: Typical Definitions of Service
A service is any act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything [Kotler and Keller, 2006].
A service is a time-perishable, intangible experience performed for a customer acting in the role of a coproducer [Fitzsimmons and Fitzsimmons, 2006].
A service is a change in the condition of a person, or a good belonging to some economic entity, brought about as a result of some other economic entity, with the approval of the first person or economic entity [Hill, 1977].
Services are capabilities or competencies that one person, organization, enterprise, or system provides for another [Vargo and Lusch, 2004a].
A service is a provider-client interaction that creates and captures value [IBM Research, 2010].
An article called "Foundations and Implications of a Proposed Unified Services Theory" surveyed the literature to date and found one unique characteristic: "With service processes, the customer provides significant inputs into the production process" [Sampson and Froehle, 2006].
Service is "the application of competences (knowledge skills, and resources) by one entity for the benefit of another entity in a non-coercive (mutually agreed and mutually beneficial) manner" [IfM and IBM, 2008].

In contrast, computer scientists tend to view service within the paradigm of client-server computing, whereby a client entity poses an unambiguous request to a server entity, which produces an unambiguous response. The client and server are machines that interact through definable IT-based interfaces. Neither the client nor the server has the capability of discerning unstated needs, interests, or concerns, methods used by the other, or anything else that is not included in explicitly coded messages governed by the requirements of the interface. Statements in *IBM Systems Journal* illustrate this paradigm:

> A service "is generally implemented as a course-grained, discoverable software entity that exists as a single instance and interacts with applications and other services through a loosely coupled (often asynchronous), message-based communication model" [Brown et al., 2005].
>
> "The component that consumes business services offered by another business component is oblivious to how the provider created the business service" [Cherbakov et al., 2005]

Researchers associated with the IS field have approached services from both directions. Research about service organizations, service products, the service economy, and customer service mostly concern services with human providers and human consumers. Even IT-based services such as Internet service provision and online auctions are often viewed as having human providers who provide technical capabilities that are used by human consumers. Current interest in ITIL and COBIT is about managing and controlling IT services provided by IT groups for business organizations. On the other hand, a number of researchers within the IS field are involved in research related to the technical and conceptual underpinnings of service-oriented architectures (e.g., an issue of *Information System Frontiers* on the theme "From Web Services to Services Computing" [Zhao et al., 2007]).

A simple definition of service. Aside from being clear and readily understandable, a good definition of service might cover every type of activity that most people would view as a service, such as performing surgery, installing networks, writing computer programs that others will use, providing Internet-based search capabilities, accepting orders through an ecommerce website, building customized houses, producing cars to customer specifications, providing leisure opportunities on golf courses, performing legal work, and selling groceries in a supermarket. Some of these examples involve things that are often considered goods, such as cars and houses. Difficulty finding fundamental distinctions between things done for someone else and things produced for someone else is one of the reasons why most marketing books view a firm's economic offerings as a combination of products and services, rather than either pure products or pure services. Knife-edge distinctions between product and service are important for economists trying to characterize economies using SIC codes or other categories, but relatively unimportant for the IS field, which is more concerned with describing, evaluating, and improving IT applications and IT-reliant systems in organizations.

We adopt a simple, dictionary-like definition of service:

> *Services are acts performed for someone else, including providing resources that someone else will use.*

This definition can be extended into the realm of service computing by substituting "another entity" for "someone else." That is, totally automated IT services can be viewed as acts performed by one entity for a different entity, including providing resources that a different entity will use.

This definition of service encompasses a wide range of services:

- services for external customers and for internal customers
- automated, IT-reliant, and non-automated services
- customized, semi-customized, and non-customized services
- personal and impersonal services
- repetitive and nonrepetitive services
- long-term and short-term services
- services with varying degrees of self-service responsibilities

In effect, this definition assumes that every purposeful action performed for the benefit of someone else is a service independent of whether the result is customized, intangible, or consumed as produced (characteristics often associated with services). This interpretation is consistent with discussions that have gone on in marketing for over fifty years. For example, in the *Harvard Business Review* article "Marketing Myopia," Leavitt [1960] noted, "People don't buy a quarter-inch drill. They buy a quarter-inch hole. You've got to study the hole, not the drill. The drill is just a solution for it." More recently, Vargo and Lusch [2004a] extended that train of thought in their widely discussed "service-dominant logic," which they compare to goods-dominant logic which they view as the basis of traditional economic thought. They argue that value to the customer is the primary issue; whether that value is delivered through goods or services per se is secondary. One of eight foundational premises in their 2004 summary of service-dominant logic is that "goods are distribution mechanisms for service provision." Thus, distinctions between products and services may not be fundamental for understanding how value is delivered. If service is an act performed for someone else, the production of physical things can be viewed as services.

Based on the definition, just about everything that happens in business is a service because it involves purposeful action performed for the benefit of someone else. With this definition one might wonder whether the distinction between products and services is useful. As will be discussed below, the distinction is useful for a number of reasons related to connotations, assumptions, and characteristics often associated with service.

The introduction mentioned that this paper covers five steps toward thinking of systems as services in the IS field. The following sections discuss those steps in turn.

IV. STEP 1: THINK OF SYSTEMS AS SERVICE SYSTEMS

According to our definition, services are acts performed for someone else, including providing resources that someone else will use. Viewing systems as services has two implications that differ from typical approaches in IS.

1. Systems should be viewed as service systems, a term that will be defined below.
2. Systems should be modeled as though the customer's needs and interests genuinely matter.

In other words, customers and customer issues should be prominent throughout the analysis of systems.

In contrast to those two implications, typical ways of thinking about systems in the IS field consider the customer only indirectly, if at all. For example, the common model of input-processing-output is not service-oriented because it focuses on the process of converting inputs into outputs and says nothing about customers. Tools such as use cases focus on the situations in which users employ IT artifacts. These users might be viewed as customers of the IT group, but they often are neither customers of the information system that is being described nor customers of whatever work systems the information system supports. If users were customers in a genuine sense of that term, they would receive and benefit from whatever the information system produced. In contrast, users of IT artifacts often do the work in information systems instead of benefiting from what those systems produce.

The work system framework [Alter, 2003; 2006; 2008a; 2008b] provides a highly organized way to think of systems as service systems and to keep customers in view.

Definition of work system. A work system is a system in which human participants and/or machines perform work using information, technology, and other resources to produce products and/or services for internal or external customers. Typical business organizations contain work systems that procure materials from suppliers, produce products, deliver products to customers, find customers, create financial reports, hire employees, coordinate work across departments, and perform many other functions. Almost all significant work systems in business and governmental organizations rely on IT to operate efficiently and effectively.

Definition of service system. A service system is a work system that produces services for customers.[1] Every work system that produces products and services for people other than system participants is a service system. Thus, almost every system in an organization is a service system, and the ideas about work systems in general apply to those systems. Table 4 presents a representative list of the service systems chosen for analysis by advanced MBA students at Georgia State University in response to an assignment to analyze a work system in their own organization [Truex and Alter, 2010]. The work systems they chose were all service systems by our definition.

Table 4: Service Systems Selected by Employed MBA Students Assigned to Analyze Work Systems in their Own Organizations

• Insurance policy renewals	• Performing portfolio management in a wealth management organization	• Finding and serving sales consulting clients
• Timekeeping for field technicians for a public utility	• Planning and dispatching trucking services	• Determining government incentive for providing employee training
• Receiving materials at a large warehouse	• Scheduling and tracking health service appointment	• Invoicing for construction work
• Controlling marketing expenses	• Determining salary increases	• Performing financial planning for wealthy individuals
• Acknowledging gifts to a high profile charitable organization	• Operating an engineering call center	• Planning for outages in key real time information systems
• Performing pre-employment background checks	• Administering budgets for grants	• Approving real estate loan applications
• Purchasing advertising services through an advertising agency	• Collection and reporting of sales data for a wholesaler	• Acquiring clients at a professional service firm
	• Determining performance-based pay	

Other special cases of work system. In contrast, the IS field covers a number of important special cases of work systems that are more restrictive:

- An **information system** is a work system whose processes and activities are devoted to processing information, i.e., capturing, transmitting, storing, retrieving, manipulating, and displaying information.

- A **project** is a work system designed to go out of existence after producing specific products and services for customers. Each major project phase or subproject might also be viewed as a separate work system with its own processes and activities, participants, and products.

[1] Other researchers have proposed other definitions of service system. For example, the definition in the 2008 final white paper from an international symposium related to IBM's SSME initiative said, "a service system can be defined as a dynamic configuration of resources (people, technology, organizations and shared information) that creates and delivers value between the provider and the customer through service. In many cases, a service system is a complex system in that configurations of resources interact in a non-linear way. Primary interactions take place at the interface between the provider and the customer. However, with the advent of ICT, customer-to-customer and supplier-to-supplier interactions have also become prevalent. These complex interactions create a system whose behavior is difficult to explain and predict" [IfM and IBM, 2008, p. 6].

- A **supply chain** is an interorganizational work system devoted to procuring materials and other inputs required to produce a firm's economic products and services. The firm and specific suppliers are participants in processes and activities that use specific information and technology to create, monitor, and fulfill orders.

- A **self-service system** is a work system whose customers use technical resources within the service system to produce things, information, or other outcomes that are of personal or job-related benefit. This case is consistent with the definition of service as acts performed for someone else, including providing resources that someone else will use.

Work system framework. As shown in Figure 1, the nine elements of the work system framework [e.g.,Alter, 2008a] are the basis for describing and analyzing an IT-reliant work system (and hence, a service system) in an organization. This framework is designed to emphasize business rather than IT concerns. It covers situations whose business process may be tightly defined or may be semi-structured, and that may be IT-intensive or may not use IT at all. Even a rudimentary understanding of a work system (or service system) requires awareness of each of the nine elements.

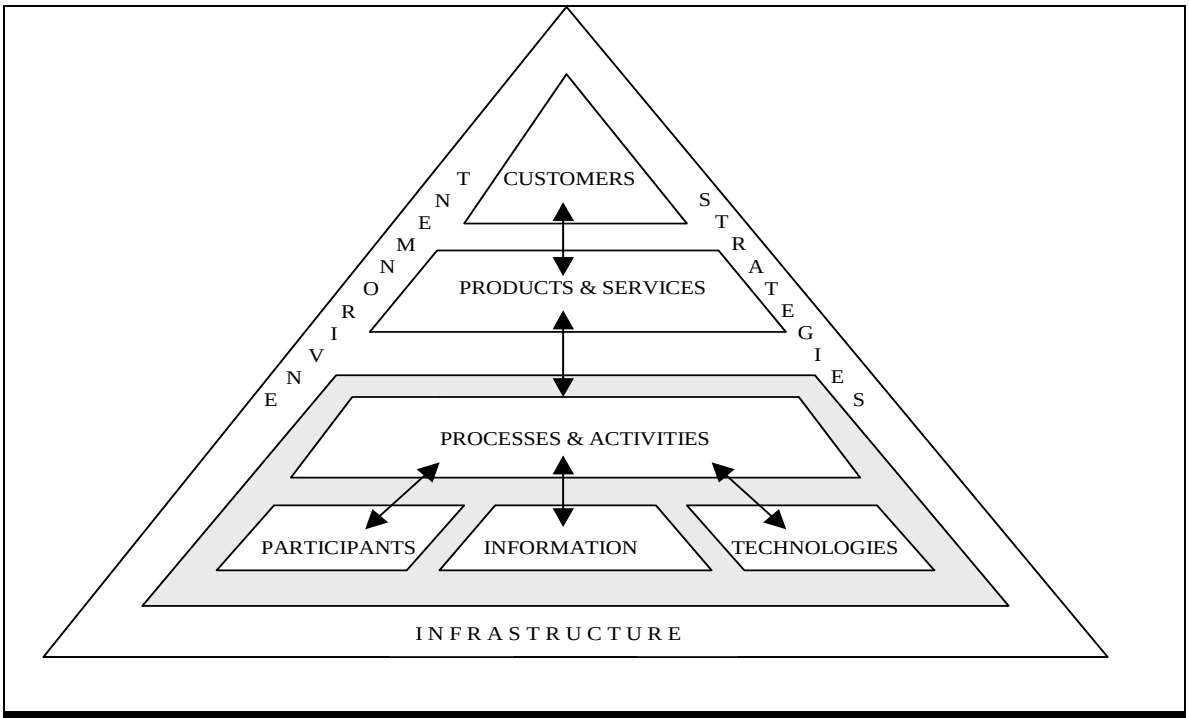


Figure 1. The Work System Framework (as Updated in Alter (2008a))

Placing the customer at the top of the framework is a step toward viewing systems as services because the customer appears at the top of the framework. Anyone using the work system framework automatically goes through the following thought process:

Customers first. The work system exists to produce products and services for customers. Therefore, it is insufficient to focus totally on the internal operation of the work system. An understanding or analysis of a work system must include the customer's evaluation of whatever the system produces.

Path to customer satisfaction. The arrows in the framework represent the links through which a change in one element can affect another element. Changes in customer needs lead to desired changes in the form, cost, or quality of products and services, which, in turn, lead to desired changes in processes and activities, information, technologies, and knowledge, skills, and other characteristics of participants. From the other direction, changes in information and technology can be evaluated based on their impact on both internal efficiency and customer satisfaction.

Placing the work system's customers at the top of the framework and keeping work system customers in view throughout the analysis reflects a deeper service mindset than asking for IT requirements, building IT capabilities that fits those requirements, and assuming that the users of the IT capabilities will be happy. Two or more years

later, when the IT capabilities are delivered, the original IT capabilities may or may not support the work system that would now suit customer wants and needs, regardless of whether IT users are happy.

Consistent with its service emphasis, the work system framework contains slots for customers and participants, but not for users. Customers are the direct beneficiaries of whatever the work system produces. Participants are people who perform the non-automated work in the work system. The term *participants* (not users) is included because nonusers of IT may play important roles in work systems. The usage of technology may be of secondary importance to key participants in many work systems. Thus, while a typical IT group's focus on users, the usage of IT, and user satisfaction is certainly worthwhile, a deeper service mindset would increase the amount of attention focused on all work system participants and customers.

V. STEP 2: RECOGNIZE THAT THE VALUE FROM SERVICES TENDS TO BE COPRODUCED BY PROVIDERS AND CUSTOMERS.

The work system framework is a first step toward viewing systems as services. To go beyond the service-related ideas in the work system framework, we can incorporate a set of generic activities and responsibilities of service providers and service customers.

Service value chain framework. Starting with Porter [1985], value chain models have become common in the business literature. Such models focus on a firm or organization's activities that add value for customers or that support value added steps. Most of these models emphasize a producer viewpoint. Porter's model focuses largely on the internal operations of manufacturers.

Figure 2 shows a service value chain framework [Alter, 2008b] that incorporates typical categories of service activities and responsibilities. This framework augments the work system framework by introducing activities and responsibilities associated with services. Each element of this framework is important for many, but not all service systems. The entire service value chain for a service can be viewed and analyzed as a single work system. Alternatively, different subsystems in Figure 2 (such as provider preparation or negotiation of commitments) might be analyzed as separate work systems.

The bilateral form of the service value chain framework is based on the widely accepted observation that value from services is coproduced by service providers and service consumers. Ing [2008] traces the formalism of coproduction back to Ackoff and Emery [1972], with further development by Normann and Ramirez [1994, 2000] and Ramirez and Wallin [2000]. The closely related term "co-creation of value," appeared in the subtitle of a widely noted book on competition [Prahalad and Ramaswamy, 2004]. Also, one of the foundational premises of Vargo and Lusch's [2004a] service dominant logic is "the customer is always a coproducer."

The service value chain framework's form and content encapsulate a series of assumptions related to service:

- **Importance of activities and responsibilities.** Understanding services requires attention to activities and responsibilities of both service providers and service customers.
- **Coproduction of value.** As noted above, the value of a service tends to be coproduced by service providers and service customers. Thus, the customer has responsibilities, and that customer's value involves more than just receiving and using whatever the service system happens to produce. For example, the success of medical care in everyday life depends partially on the quality of the doctor's diagnosis and partially on the patient's compliance with whatever the doctor prescribes. Similarly, the success of an outsourced data center depends partly on the outsourcing vendor and partly on the company receiving the outsourcing services.
- **Internal and external customers.** Basic ideas about services are largely the same regardless of whether services are directed at external customers, internal customers, or both.
- **Customer experience.** The entire experience that typical customers associate with acquiring, receiving, and benefiting from a particular service affects customer satisfaction.
- **Service encounters.** The quality of service encounters [e.g., Czepiel et al., 1985] between service providers and customers is often a key determinant of customer satisfaction.
- **Beyond fulfilling a request.** Although the fulfillment of a service request is typically viewed as the core of the service, activities related to awareness, negotiation, setup, handling of the request, and follow-up impact service quality and satisfaction.

- **Negotiated commitments.** Many service situations involve delivery of services based on negotiated commitments under which the service may be requested and delivered repeatedly. For example, the outsourcing literature often notes that the quality and thoroughness of negotiated mutual commitments is a key determinant of whether long term services will meet needs and will be cost effective (e.g., Cullen et al., 2005].

- **Preparation.** Preparation by providers and/or customers prior to each instance of service delivery is often essential for service efficiency and effectiveness.

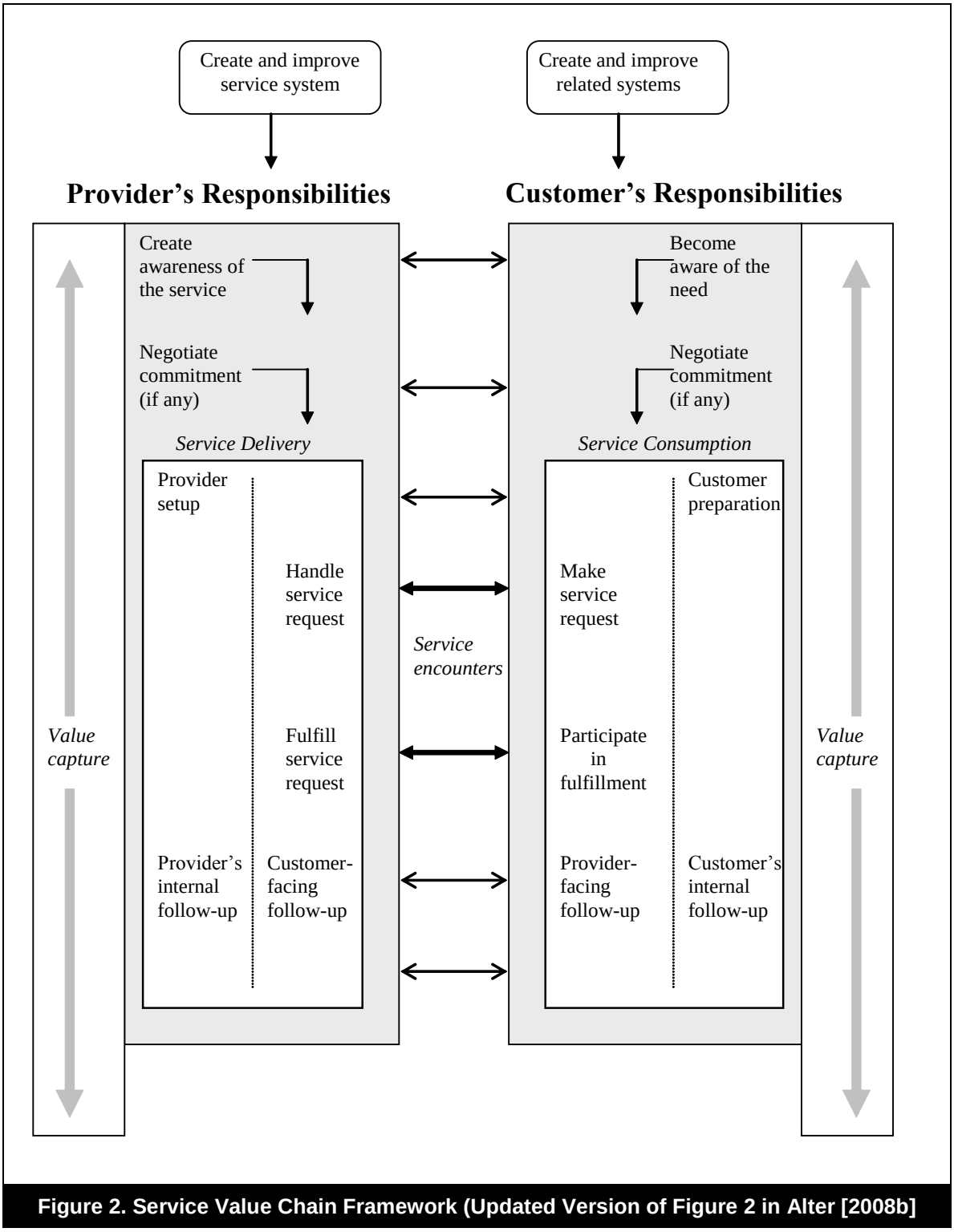


Figure 2. Service Value Chain Framework (Updated Version of Figure 2 in Alter [2008b]

Communications of the Association for Information Systems

- **Service request.** For many services, each instance of service delivery includes an explicit or implicit service request. The handling of the service request is an important part of service delivery and often affects customer satisfaction.

- **Front-stage and back-stage.** Services often involve front-stage and back-stage activities by both service providers and customers [e.g., Teboul, 2006].

- **Follow-up.** Some services require follow-up by providers and/or customers. Follow-up may be related to a single service instance (Was the installation OK?) or to multiple service instances (How responsive is your account manager?).

- **Value capture.** Customers may experience benefits as the service is produced and/or may experience benefits later. Value capture, represented by the leftmost and rightmost portions of the service value chain framework, includes the customer's experience of attaining value from the service and the provider's experience of attaining value in exchange for the customer's value.

The service value chain framework is a useful lens for viewing systems as services. Just as the work system framework helps a user focus attention on the generic elements of a work system, the service value chain framework helps in focusing attention on the generic elements of services.

The service value chain framework was first proposed in Alter [2007a] along with a related systems analysis tool that will be discussed in Step 5 (Section IX). No empirical research has been done to determine whether typical business people or systems analysts make organized use of the concepts built into the service value chain framework. Suffice it to say that ideas such as service interaction, front stage vs. back stage, and other topics represented in Figure 2 appear in the marketing and organization behavior literature but are not considered important concepts in the IS field. Most of those topics are not included explicitly in typical systems analysis methods or tools. Viewing systems as services calls for greater attention to those concepts when thinking and communicating about systems in organizations.

Concepts in the service value chain framework can facilitate the evaluation, analysis, and design of IT-reliant work systems by highlighting ideas and distinctions that a provider-centric analysis might overlook, such as:

- Customer responsibilities, not just internal production processes
- Benefit capture over time by the customers
- Service encounters before, during, and after the time when the products and services are produced
- Front-stage versus back stage activities
- The form and content of negotiations and service requests
- Preparation prior to service fulfillment by the producer and by the customer
- Producer and customer follow-up subsequent to request fulfillment

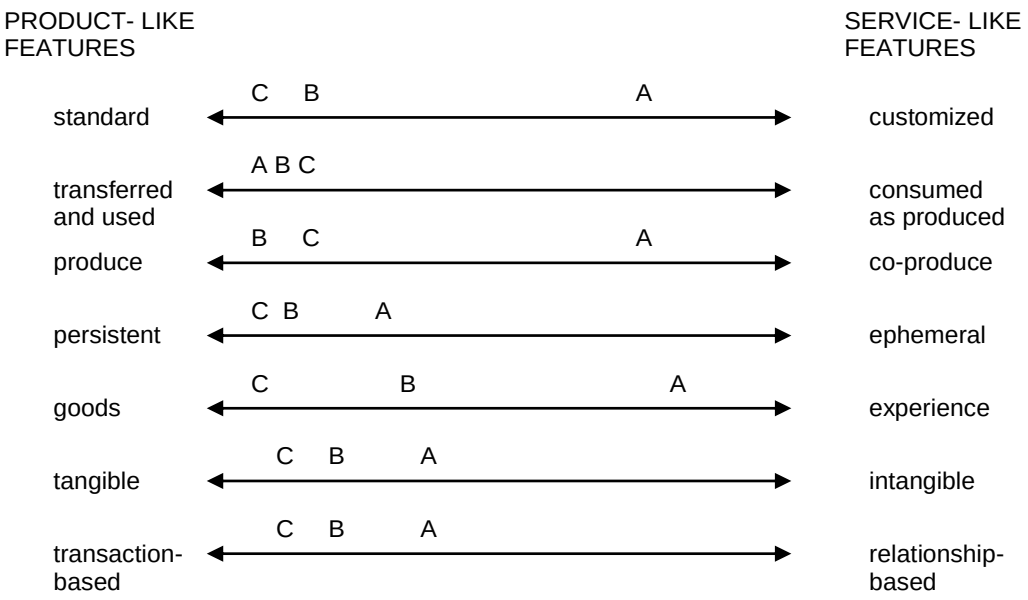
VI. STEP 3: RECOGNIZE THE SIGNIFICANCE OF SERVICE-RELATED DESIGN DIMENSIONS

Important characteristics of business processes can be described using a number of design dimensions, such as degree of structure, range of involvement, level of integration, complexity, rhythm (frequency), and degree of automation, among others [Alter, 2006]. Focusing on these dimensions when evaluating, analyzing, or designing a work system helps in discussing big picture issues before plunging into details. Using degree of structure as an example, an early stage in the design of a work system might decide whether the work is essentially unstructured, semi-structured, or unstructured, and, more specifically, where an ideal work system would be along that dimension on a scale from 0 to 100. Regardless of a work system's current location on that scale, the analysis of the system might consider whether a more structured or less structured approach would generate better results.

Dimensions of service. The same type of distinction can be applied to dimensions of service. From a business viewpoint, the distinction between products and services is much less important than providing a mix of product and service features that (internal or external) customers want. Figure 3 shows a set of product/service dimensions along with hypothetical preferences of three committee members in an ERP project. In addition to detail-oriented issues concerning software features, vendor strength, and price, the committee might consider high-level issues about the

extent to which they want product or service features. From the other side, vendors might think about their own offerings in similar terms, and might think about shifts along these dimensions as big picture responses to customer needs or wants.

As illustrated in Figure 3, the primary value of the many suggested definitions of service (see Table 3) and frequently cited characteristics of service (such as intangible, fundamentally about an experience, customized, and consumed as produced) is in the way they contribute dimensions that make a system's output more product-like or more service-like. The continual development of new IT capabilities increases the flexibility in customer offerings and creates many new possibilities of combining product-like and service-like features.



A, B, and C represent three members of a hypothetical ERP project committee. The relative placement along each dimension represents their views of what they want. For example, A believes that a substantial amount of customization will be necessary, whereas C and B want to install a standard software product without customization. On the dimension of persistent versus ephemeral, A believes that whatever is introduced initially will have to change; C wants to do it right the first time; B is somewhere between A and C.

Figure 3: Product-Like versus Service-Like Features. Source: Alter [2006]

That services tend to be coproduced provides another example of why the interesting question is where a service might be along a service dimension, rather than whether a characteristic is or is not present. The extent of value coproduction can be viewed as a continuum from no coproduction to extensive coproduction by the customer. Typical points along this dimension include:

- The customer does nothing.
- The customer provides a request for service but does little else (minimal level of coproduction).
- The customer participates in some aspects of service fulfillment processes (beyond specifying requirements).
- The service occurs largely through multiple service interactions including direct participation by customers.
- A self-service approach is used, whereby the service provider creates and provides the means by which the customer performs self-service processes and activities.

The extent to which the customers of the specific service system are or might be coproducers of value is the interesting question. The evaluation involves characterizing the current service system along a low-to-high dimension of value coproduction and identifying possible changes along that dimension that could improve effectiveness and/or efficiency. The changes can be in the direction of more or less coproduction of value.

Communications of the Association for Information Systems

Dimensions of customer-centricity for service systems. A customer-centric work system is defined as a work system that recognizes and responds fully to customer needs. [Alter, 2007b]. As with the dimensions of service, a multi-dimensional view of customer-centricity is much more useful than a binary, yes/no view.

Applying the idea of customer-centricity to service systems provides another step toward using a service metaphor when analyzing or designing IT-reliant work systems. Elements of the work system framework point to a variety of directions for increasing a service system's customer-centricity. For example, a work system's customer-centricity can be increased by customizing the products and services it produces, by changing the process to accentuate coproduction, by personalizing the technology used, or by using customer information more effectively. Table 5 lists twelve dimensions of customer-centricity, each of which is related to a specific work system element.

Table 5: Dimensions of Customer-Centricity Related to Elements of the Work System Framework

Work system element	Dimension
Customer	• Recognizing and responding fully to customer needs • Providing a satisfying customer experience
Products and services	• Producing customized products and services
Processes and activities	• Personalizing or customizing processes and activities • Using customer information to maximize benefits for customers • Relying on coproduction or self-service by customers
Participants	• Non-customer participants recognize and emphasize customer needs and priorities
Information	• Availability of customer-related information to maximize benefits for customers
Technology	• For any technology used by customers, personalization or conformity to customer work practices, standards, terminology, convenience, or tastes.
Infrastructure	• Avoidance of interfering with or operating incompatibly with relevant aspects of the customer's infrastructure.
Environment	• Operating consistent with the customer's environment wherever the customer is involved with coproduction
Strategy	• Producing products and services that are consistent with the customer's strategies.

The dimensions in Table 5 were chosen based on the assumption that each of them contributes to the likelihood that a work system (or service system) will recognize and respond fully to customer needs. Exceptions, such as specific service systems whose customers do not care about customized products and services, do not undermine the independent association of each dimension with customer-centricity. A service system's location on each of the dimensions can be rated on a scale such as 0 to 3 or 0 to 7 either for evaluating a service system's customer-centricity or as an aid in designing or improving a service system.

Customer-centricity in phases of service provision. The phases of the service value chain framework provide additional ideas that can be used in designing and evaluating the customer-centricity of a work system. Table 6 presents ten customer-centricity dimensions related to those phases. The dimensions in Table 6 are not as broadly applicable as those in Table 5 because many service systems encompass only one or two of the phases in the service value chain framework. (In practice, the decision about which phases of the service value chain framework to include in the service system that is being analyzed depends on the nature and scope of the problem that made it worthwhile to perform the analysis. If the problem is basically about a particular phase, that phase defines the scope of the work system that is being analyzed, and the other phases are treated as part of other work systems.) Table 6 suggests areas in which a work system's customer-centricity might be improved. As with the dimensions in Table 5, it is possible to convert each dimension into a question that can be used to evaluate a work system on a 0 to 3 or 0 to 7 scale.

Table 6: Dimensions of Customer-Centricity Related to Phases of the Service Value Chain Framework	
Phase	**Dimension**
Awareness	• Making the customer aware of the availability, scope, and significance of the service
Commitment	• Providing a comfortable and mutually effective process of negotiating any commitments that are relevant to subsequent service provision
Preparing	• Preparing for specific instances of service delivery • Making it easy and convenient to the customer to perform for any necessary preparations
Requesting service	• Providing a comfortable and mutually effective process through which the customer can make requests and the provider can respond to requests related to a specific service instance
Fulfilling the request	• Performing the work that fulfills the request • Making the customer's participation in the fulfillment phase comfortable and effective.
Follow-up	• Performing any follow-up that is necessary to ensure that the customer receives the anticipated benefits from the products and services provided. • Making any follow-up by the customer comfortable and effective.
Service encounters	• Assuring that service encounters that occur through the service value chain are performed professionally and effectively

VII. STEP 4: RECOGNIZE HOW SERVICE SYSTEMS CHANGE AND EVOLVE

From a business viewpoint, projects that attempt to improve the way service is provided or coproduced should be viewed as service system projects, not IT projects.[2] Looking at how a service system changes and evolves calls for a life cycle model that describes how service systems and other work systems evolve.

Work system life cycle model. A work system evolves through iterations of planned and unplanned change. The work system life cycle model (WSLC) in Figure 4 describes how work systems change over time. The planned changes occur through formal projects with initiation, development, and implementation phases. The unplanned changes are ongoing adaptations and experimentation that change aspects of the work system without performing formal projects.

The WSLC is fundamentally different from the frequently cited system development life cycle (SDLC). First, the SDLC is basically a project model rather than a system life cycle. Some current versions of the SDLC contain iterations, but even those are basically iterations within a project. Second, the system in the SDLC is a basically a technical artifact that is being programmed. In contrast, the system in the WSLC is a work system that evolves over time through multiple iterations. This evolution occurs through a combination of defined projects and incremental changes resulting from small adaptations and experimentation. In contrast with control-oriented versions of the SDLC, the WSLC treats unplanned changes as part of a work system's natural evolution.

[2] Unless the service is a computer-to-computer service totally within technical infrastructure

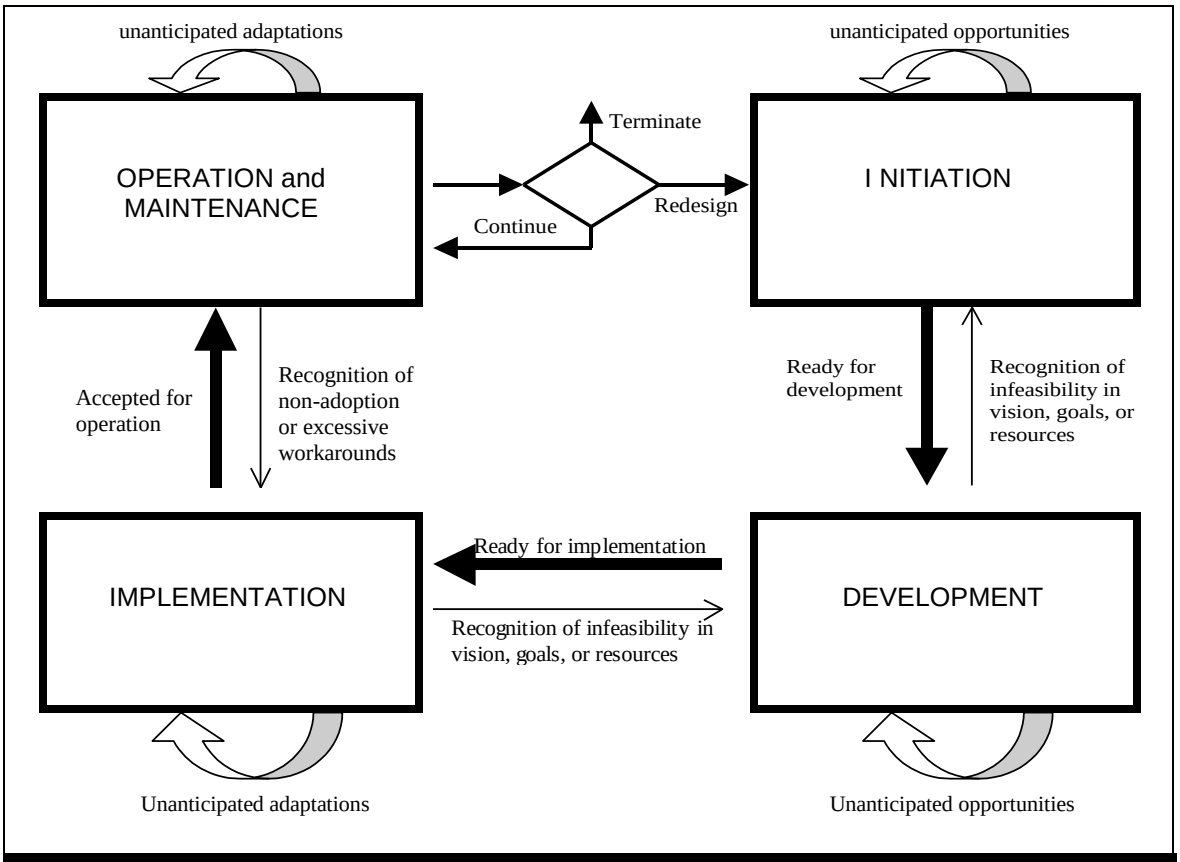


Figure 4. The Work System Life Cycle Model (Alter, 2008a)

The WSLC is consistent with viewing systems as services. It focuses on the work system (service system), rather than the IT system, thereby emphasizing things that business professionals tend to perceive and understand. For that reason, focusing on the service system increases the likelihood that business professionals will be able to comment knowledgably about analysis, design, and implementation issues.

Coproduction of value throughout the WSLC. The WSLC's work system (service system) emphasis is also consistent with the fact that service system projects typically involve coproduction of value by business and IT professionals. Service system projects require business/IT coordination because the projects cannot stay on track without attention from business professionals and cannot succeed without technical capabilities provided by IT professionals. Thinking of a project as a service system project necessarily implies coproduction of value across all four phases of Figure 4.

Operation and maintenance phase. Business professionals manage the service system, including its continuous improvement unrelated to IT. Business and IT professionals share the responsibility of monitoring alignment between IT capabilities and service system needs, and coordinating continuous improvement related to IT capabilities. IT professionals maintain hardware and software.

Initiation phase. Business professionals define business problems and goals, priorities, constraints, and success criteria. Business and IT professionals outline the general approach for addressing problems and attaining goals. They are also responsible for agreeing on organizational and economic feasibility of the project and for producing the initial project plan for improving the work system. IT professionals identify how IT can contribute and define IT-related goals for the project.

Development phase. Business professionals work with business and IT analysts to specify how the improved service system should operate. Ideally, they would evaluate the usability of hardware and software and participate in debugging of application features and user interfaces. Business and IT professionals are jointly responsible for determining detailed requirements for the service system and user-visible features of IT capabilities. Ideally, they would agree about whether hardware and software are ready for implementation in the organization. IT professionals acquire, develop, modify, and debug hardware, software, and documentation.

Implementation phase. Business professionals manage implementation in the organization, and monitor both acceptance and resistance. Whether or not they are involved in training on IT details, they might be involved in training on new work practices and in assuring the success of aspects of conversion that are unrelated to IT capabilities. Business and IT professionals have joint responsibility for keeping the implementation on track, deciding whether additional IT modifications are needed, converting to new work practices that involve IT, and verifying that the implementation is successful. IT professionals modify hardware and software as needed for successful implementation.

VIII. STEP 5: INCORPORATE SERVICE-RELATED CONCEPTS AND TOOLS INTO THE EVALUATION, ANALYSIS, AND DESIGN OF SYSTEMS

Systems analysis methods and tools in IS focus primarily on requirements and specifications for hardware and software. In particular, typical systems analysis approaches using the Unified Modeling Language (UML) or other rigorous, software-oriented formalisms are not oriented toward viewing socio-technical systems as services. Consider, for example, the UML, which is often viewed as an accepted standard for object oriented systems analysis. The UML "is a language for specifying, visualizing, constructing, and documenting the artifacts of software systems, as well as for business modeling and other non-software systems … The UML must and can support all reasonable programming languages. It also must and can support various methods and processes of building models" [Booch, Jacobson, and Rumbaugh, 2000]. Most of the effort in using UML in the Rational Unified Process (RUP) and related methods is directed toward requirements and specifications for a software system, even though object oriented analysis typically starts with use cases that identify the various business uses of the software. A UML glossary in Wikipedia [2008a] illustrates the software-oriented emphasis in UML by including the terms *class, state, component,* and *polymorphism,* but not the service-oriented terms *product, service, participant,* or *customer.* The glossary represents people (users, customers, etc.) through the term *actor,* which is defined as "a role that a user takes when invoking a use case."

Making service concepts more visible in systems analysis and design generates important benefits by providing additional descriptions and insights beyond those notations, tools, and methods that support rigorous specification of software. Making service concepts more visible expands the scope of topics considered by system analysts and designers. It also improves user engagement by focusing more on business and organizational concerns.

This section provides illustrative examples of how to make service concepts more visible in systems analysis by incorporating service-related concepts and tools into the evaluation, analysis, and design of systems. It discusses a systems analysis tool related to each of the four previously discussed steps for moving toward viewing systems as services:

- Include the customer in the analysis.
- Include coproduction of value in the analysis.
- Include service-related design dimensions in the analysis.
- Plan and manage projects as though service system improvements are coproduced.

The tools presented here should be viewed as examples among many other possible tools that might emerge from the intention to view systems as services when analyzing and designing systems. The overarching point is that making service concepts more visible in systems analysis is both possible and potentially beneficial.

Include the Customer in the Analysis

Current IS systems analysis methods start with obtaining user requirements. The underlying assumption is usually that a tool is being built and that the development of the right tool requires inputs from users of the tool and other stakeholders. Including customers in the analysis goes a step further by emphasizing the customers of the work system (service system), not just the users of the tool.

Work system snapshot. Application of the work system framework (Figure 1) to a particular situation can be summarized using a work system snapshot, a one-page summary used to attain agreement about the scope and purpose of the work system that is being analyzed (see Table 7). A work system snapshot uses six central elements of the work system framework to summarize a work system and what it produces. Limiting a work system snapshot to a single page avoids excessive detail in the initial stage of the analysis. Creating and discussing a work system snapshot at the beginning of an analysis can be useful in clarifying and attaining agreement about the scope and purpose of the work system being analyzed. Three work system elements—environment, infrastructure, and strategy—are not included in the work system snapshot in order to make it easier to use and to allow it to fit on one

page. Those topics are considered as the analysis goes deeper. Table 7 shows a work system snapshot related to a hypothetical loan application and underwriting system that combines functional characteristics from several real world systems [Alter, 2006].

Table 7: Work System Snapshot for a Loan Application and Underwriting System

Customers	**Products & Services**
Loan applicant Loan officer Bank's Risk Management Department and top management Federal Deposit Insurance Corporation (FDIC)	Loan application Loan write-up Approval or denial of the loan application Explanation of the decision Loan documents

Major Activities or Processes

Loan officer identifies businesses that might need a commercial loan.

Loan officer and **loan applicant** discuss financing needs and discuss possible terms of the proposed loan.

Loan officer helps **loan applicant** compile a loan application including financial history and projections.

Loan officer and **senior credit officer** meet to verify that the loan application has no glaring flaws.

Credit analyst prepares a "loan write-up" summarizing the applicant's financial history, providing projections explaining sources of funds for loan payments, and discussing market conditions and applicant's reputation. Each loan is ranked for riskiness based on history and projections. Real estate loans all require an appraisal by a licensed appraiser (outsourced to an appraisal company).

Loan officer presents the loan write-up to a **senior credit officer** or **loan committee**.

Senior credit officers approve or deny loans of less than $400,000; a **loan committee** or executive loan committee approves larger loans.

Loan officers may appeal a loan denial or an approval with extremely stringent loan covenants. Depending on the size of the loan, the appeal may go to a committee of senior credit officers, or to a loan committee other than the one that made the original decision.

Loan officer informs **loan applicant** of the decision.

Loan administration clerk produces loan documents for an approved loan that the client accepts.

Participants	**Information**	**Technologies**
Loan officer Loan applicant Credit analyst Senior credit officer Loan committee Loan administration clerk Real estate appraiser	Applicant's financial statements Financial and market projections Loan application Loan write-up Explanation of decision Loan documents	Spreadsheet consolidating information Loan evaluation model MS Word template Internet Telephones

Research to date indicates that work system snapshots and a work system approach are useful for summarizing IT-reliant systems [Petrie, 2004] and for helping undergraduate students [Petkov and Petkova, 2006] and employed MBA students [Truex and Alter, 2010] think about IT-related business situations in work system terms.

Four basic guidelines for a work system snapshot are:

- For purposes of the analysis, the work system is the smallest work system that has the problem or opportunity that motivated the analysis.
- The work system's scope is not determined by the software that is used. (This is why a work system should not be called a "Lotus Notes system" or an "SAP system" just because it happens to use a particular brand of software.)
- The various sections of the work system snapshot should be internally consistent. For example, each of the participants has a role in at least one of the steps listed under major processes and activities. Similarly, each of the products and services listed is received and used by at least one of the customers listed.
- For the sake of clarity, each step listed under major processes and activities should be presented as a complete sentence, typically identifying the participants who perform the step.

TEACHING WORK SYSTEMS SNAPSHOTS

While learning about IT-reliant work systems, teams of employed MBA and Executive MBA students sometimes find it difficult to agree on exactly what to include in a one-page work system snapshot that summarizes a work system in one of their organizations. It is useful to remind them about the mess that would ensue if they or their organization tried to develop or install software without a negotiated agreement about what work system was to be improved, and what work system improvements were expected. More experienced students often realize quickly that a few hours devoted to attaining agreement about a work system snapshot might have helped their firms avoid significant confusion and in some cases significant losses from misdirected projects that never attained their business goals. That realization is especially common in relation to problematic CRM implementations that were viewed as IT projects rather than work system improvement projects.

Include Coproduction of Value in the Analysis

The two-sided format of the service value chain framework (Figure 2) leads to a useful and flexible analysis tool called a service responsibility table (SRT). SRTs emphasize coproduction of value by keeping customer roles in view throughout the processes and activities within the service system.

Service responsibility tables. The simplest form of SRT is a two-column swimlane diagram, with one column for providers and one for customers, and with specific provider and customer roles indicated clearly. Such a diagram is illustrated by the entries in the first two columns of Table 8. The entries in Table 8 are activities, although it is possible for entries in a two-column SRT to be responsibilities, such as a patient's responsibilities while undergoing a physical exam or a traveler's responsibilities during an airplane flight.

A three-column SRT adds a column for topics that are important for analyzing a particular system. For example, the third column in Table 8 associates problems or issues with specific steps. Another possible third column much later in the analysis would identify recommendations related to each step.

It is also possible to include additional rows related to the service system as a whole. Those rows summarize metrics (such as total cycle time or total capacity) or issues (such as participant burnout or overall customer satisfaction) for the entire service system. In the bank loan example in Table 7, the problems or issues for the system as a whole would include inadequate profitability of the bank and questions about whether incentives of the bank are aligned with incentives of system participants.

Table 8: Three-Column Service Responsibility Table (SRT) for a Loan Approval System		
Provider Activity or Responsibility	***Customer Activity or Responsibility***	***Problems or Issues***
Loan officer identifies businesses that might need a commercial loan.		• Loan officers are not finding enough leads.
Loan officer contacts potential loan applicant.	**Potential loan applican**t agrees to discuss the possibility of receiving a loan	
Loan officer discusses loan applicant's financing needs and possible terms of the proposed loan.	**Potential loan applicant** discusses financing needs.	• Loan officer is not able to be specific about loan terms, which are determined during the approval step, which occurs later.
Loan officer helps loan applicant compile a loan application.	**Loan applicant** compiles loan application.	• Loan applicant and loan officer sometimes exaggerate the applicant's financial strength and prospects.
Loan officer and **senior credit officer** meet to verify that the loan application has no glaring flaws.		• 20% of loans applications have glaring flaws.
Credit analyst prepares a "loan write-up" summarizing the client's financial history, providing projections of sources of funds for loan payments, etc.		• 10% rate of significant errors, partly because credit analysts use an error prone combination of several spreadsheets and a word processing program. • Much rework due to inexperience of credit analysts.
Loan officer presents the loan write-up to a senior credit officer or loan committee.		• Meetings not scheduled in a timely manner. • Questions about exaggerated statements by some loan officers.
Senior credit officer or **loan committee** makes approval decision.		• Excessive level of non-performing loans. • Rationale for approval or refusal not recorded for future analysis.
Loan officer informs loan applicant of the decision.	**Loan applicant** accepts or declines an approved loan.	• 25% of refused applicants complain reason is unclear. • 30% of applicants complain the process takes too long.
Loan administration clerk produces loan documents for an approved loan that the client accepts.		

Using an SRT early in an analysis serves the following purposes:

- It clarifies the scope and context of the service without requiring mastery of details that will be clarified later in the analysis by using detailed representations of workflow and logic.
- It focuses attention on activities and responsibilities rather than on details of technology and information.
- It identifies the job roles that are involved.
- It brings customer responsibilities into the analysis.
- It identifies service interactions (rows with both provider and customer responsibilities) and other steps that are not visible to customers.

A key feature of SRTs is that the inclusion of parallel columns for provider and customer responsibilities encourages the analyst to take service coproduction seriously. An analysis that uses this type of description is more likely to consider customer activities, responsibilities, and otherwise hidden assumptions about customer roles, issues, and needs.

As explained in Alter [2007a, 2008b], it is easy to add one or two additional columns to an SRT as the analysis unfolds or to use a series of SRTs that address different aspects of the analysis while framing the SRT user's attention around the steps in the first two columns. Table 9 [Alter, 2008b] lists a number of typical evaluation, analysis, and design topics that might be included in SRTs. Use of landscape format makes it possible to include additional columns without making the table too complicated to understand quickly while keeping activities and responsibilities of both providers and customers in mind.

Table 9:Typical Topics for Additional Columns of Service Responsibility Tables. Source: Alter [2008b].

Topics related to problems or issues	Topics related to the system's structure and requirements	Topics related to performance metrics
• Issues and problems by step • Participant or interpersonal issues by step • Information issues by step • Technology issues by step • Confusion or training issues by step • Possible points of friction by step • Common errors at each step • Possible reasons for rework by step • Communication issues by step • Training issues by step • Conflicts with other systems by step	• Goals or requirements by step • Information that is used in each step • Information that is generated in each step • Conditions that trigger each step • Business rules at each step • Typical exceptions at each step • Products and services produced by each step (and used in other systems by customers or provider organizations) • Possibilities for change • Constraints related to each step (i.e., things that cannot change) • External dependencies by step • Benefits provided to customers by each step	• Number of hours devoted to each step • Average delay between steps • Average error rate at each step • Average provider cost of each step • Number of customer complaints related to each customer-facing step. • Key performance gaps for important steps (Gap = desired vs. current value of an important metric.) • Critical success factors for specific steps

SRTs are not meant as detailed documentation of process or program logic. For example, the sequence of responsibilities can represent a typical sequence, but it is not necessary for the sequence to be precise and repeatable every time. Thus, SRTs apply to highly structured, predefined workflows, and also apply to "artful processes" [Hill et al., 2006] that cannot be charted in advance because they unfold differently depending on the use of knowledge and judgment to interpret whatever is revealed in previous steps. Examples of such processes include medical examinations, management processes, planning and design processes, and analysis processes. Although applicable to structured and semi-structured processes, SRTs cannot be applied to complete improvisations because activities and responsibilities cannot be described in advance.

SRTs are designed to be useful, flexible, and easy to use. Given their format as simple tables that can be produced using a word processor, SRTs can be created, manipulated, and extended easily. For example, if there is an intermediary, such as a purchasing agent who links customers and suppliers, it is possible to include three swimlane columns. It is possible to expand a two-column SRT into a complete swimlane diagram with a separate column for each role, and possibly with flowchart symbols to document flow logic. Complete swimlane diagrams are useful for documenting how processes cross roles; such diagrams can be used as embellishments of SRTs that summarize coproduction in a simpler manner. SIPOC diagrams (supplier, input, process, output, customer) are another related type of summary diagram that can document details not fully conveyed by SRTs.

Many additional variations are consistent with an SRT's basic structure. For example, if it is important to remember that certain groups of steps occur in parallel, it is possible to number the activities and use related numbers to indicate activities that occur in parallel. If it is important to record non-sequential precedence relationships in an SRT (rather than in other documentation), it is possible to add sequence-related columns that number each activity and identify one or more direct predecessors of each activity.

The suggested form of SRTs does not contain reminders to include the various types of steps in the service value chain model, such as awareness, negotiation, preparation, handing of requests, fulfillment of requests, and follow-up. These topics enter in the next step, which focuses on continuous design dimensions rather than process steps.

Include Service-Related Design Dimensions in the Analysis

The work system framework and service value chain framework incorporate or reflect a large number of concepts that can be used as continuous design dimensions when evaluating, analyzing, or designing a system. These design dimensions include, for example, unstructured vs. structured, simple vs. complex, produced vs. coproduced, and standardized vs. personalized. A system's positioning along design dimensions such as these can be viewed as a continuous design dimension, in effect, a variable that varies from 0 to 3 or 0 to 10 instead of a yes/no distinction.

Figure 3 in Section VI illustrated how these design dimensions can be used to support a discussion about a system or project's desired characteristics. Each participant in the discussion provides an opinion about the system or project's desired positioning along a low-to-high design dimension. General agreement about any particular design dimension potentially provides guidance for the detailed design. Disagreement about any particular design dimension reveals issues that should be discussed and resolved. Whether or not consensus is reached, the participants are more likely to recognize and understand the big picture work system design issues that might be reflected in the detailed design.

The same general approach can be used to characterize a current system and to summarize the desired direction and extent of change along each design dimension. Tables 10 and 11 illustrate two versions of a simple analysis tool that can be used for this purpose. We call this tool a design dimension summary. Design dimension summaries can include any or all of a large set of design dimensions (called strategy decisions in Alter [2006]) that are related to work systems in general or that specifically refer to service design or customer-centricity.

Table 10: Illustration of a Design Dimension Summary for the Loan Application Example in Table 7 (Simplest Form)	
Design dimension	***Desirable direction for change***
Degree of structure	Increase the degree of structure in the approval process by enforcing procedures and standards.
Range of involvement	No change anticipated.
Degree of integration	Produce loan write-ups through a more integrated process that uses an integrated software tool. Provide a better way to link past loan applications with the performance of past loans, thereby providing better support for making future decisions.
Complexity	Reduce the complexity of producing loan write-ups by providing better technology. Reduce the complexity of the decisions made by the loan committees by providing better guidance through a more effective, better-calibrated loan evaluation model.

Table 11: Illustration of a Design Dimension Summary for the Loan Application Example in Table 7 (Including Current and Desired Positioning)		
Design dimension	***Current and Desired Positioning (C and D)***	***Desirable direction for change***
Degree of structure	C D Lo ---------- Hi	Increase the degree of structure in the approval process by enforcing procedures and standards.
Range of involvement	CD Lo ---------- Hi	No change anticipated.
Degree of integration	C D Lo ---------- Hi	Produce loan write-ups through a more integrated process that uses an integrated software tool. Provide a better way to link past loan applications with the performance of past loans, thereby providing better support for making future decisions.
Complexity	D C Lo ---------- Hi	Reduce the complexity of producing loan write-ups by providing better technology. Reduce the complexity of the decisions made by the loan committees by providing better guidance through a more effective, better-calibrated loan evaluation model.

Design dimensions for processes and activities. Alter [2006] identifies a number of design dimensions such as degree of structure, range of involvement, level of integration, complexity, rhythm (frequency), and degree of automation. Assessments and design choices related to these dimensions can be used to motivate detailed decisions about exactly how processes and activities are to be performed.

Communications of the Association for Information Systems

Design dimensions related to products vs. services. As was illustrated by Figure 3, characteristics related to product vs. service dimensions can also be used to think about whatever a work system produces for customers. For example, to what extent might it be standard vs. customized, transferred and used vs. consumed as produced, persistent vs. ephemeral?

Design dimensions related to the service value chain framework. Concepts in the service value chain framework also form the basis of a number of fundamental design choices to consider. For example, instead of plunging into details prematurely, it is useful to look at the service design issues included in Figure 3 and other service-related design dimensions such as:

- Coproduction balance (relative amount of responsibility carried by customers vs. providers)
- Service interaction intensity (amount of the service process that involves customer interactions)
- Balance between front stage and back stage, both for providers and customers
- Degree of service automation (relative amount of service activities performed by computers)
- Negotiation intensity (time and effort devoted to negotiation versus other service-related activities)
- Intended negotiation rework (frequency and amount of time and effort devoted to reworking prior negotiations)

Design dimensions related to customer-centricity. As shown in Tables 5 and 6 in Section VI, overlaying the relatively amorphous concept of customer-centricity on top of the work system framework and service value chain framework creates a way to make that concept more useful for thinking about systems in organizations. Table 5 shows twelve dimensions of customer-centricity related to the elements of the work system framework; Table 6 shows ten dimensions related to phases in the service value chain framework. Each of those dimensions should be considered when thinking about whether a service system applies the best practical approach for satisfying customer needs and wants.

Plan and Manage Projects as Though Service System Improvements are Coproduced

Figure 4 in Section VII presented a summary view of the work system life cycle (WSLC) model. The accompanying explanation summarized aspects of coproduction by business and IT professionals across all four phases in Figure 4. The underlying rationale is that service system projects require business/IT coordination because the projects cannot stay on track without attention from business professionals and cannot succeed without technical capabilities provided by IT professionals.

A simple way to build more of a service emphasis into thinking about any system improvement project is to use an expanded service responsibility table (SRT) to summarize the steps within each phase in the WSLC and to identify the activities and responsibilities of business and IT professionals. The expanded table might look like Table 12, which covers only the initiation phase of a hypothetical project. The use of this type of tool clarifies the importance of genuine engagement by the business staff in system improvement projects that involve IT work. Identification of business and IT responsibilities in all four phases and in many steps of each phase helps minimize longstanding problems related to user participation [Markus and Mao, 2004; Alter, 2009] by clarifying the extent to which work system improvements are coproduced by business and IT, rather than just produced by the IT staff.

Table 12: Illustration of Coproduction by Business and IT Professionals in the Initiation Phase of the WSLC in a Hypothetical Project			
Step	***Business responsibility***	**IT responsibility**	**Shared responsibility**
Vision and operational goals	Define business problems and goals, priorities, constraints, and success criteria	Identify how IT innovations can contribute	Outline general approach for addressing problems and attaining goals
Allocation of resources	Allocate business staff resources and other resources	Allocate IT staff resources and other resources	Negotiate requirements and availability of resources
Clarification of time frames	Identify desired business time frame	Determine feasible IT time frame	Negotiate time frame issues
Assessment of economic feasibility	Estimate business costs, benefits, and risks	Estimate IT costs, benefits, and risks	Establish consolidated view of economic feasibility
Assessment of organizational feasibility	Identify organizational issues and risks		Establish joint approach to organizational issues and risks
Assessment of technical feasibility		Identify technical issues and risks	Negotiate any compromises related to technical issues and risks

IX. DISCUSSION AND CONCLUSIONS

This paper argues that viewing systems as services is a potentially fruitful but generally unexplored approach for thinking about systems in organizations, systems analysis, and numerous applications of IT. The five steps toward thinking of systems as services generate advantages for business and IT professionals by augmenting, rather than replacing, existing approaches in the IS field. The advantages include:

- Keeping purpose and activity in mind simultaneously
- Taking customers and coproduction seriously in systems analysis and design
- Providing synergy between different ways of looking at systems
- Augmenting tool-oriented methods with service system metaphors and tools
- Making service-related design choices more visible in analysis and design efforts
- Improving communication with business professionals
- Providing a common denominator for talking about services

These advantages are now discussed in sequence.

Keeping Purpose and Activity in Mind Simultaneously

Viewing systems as services recognizes the processes and activities that occur within systems in organizations while keeping the purpose of the system in the foreground. The work system framework and service value chain framework include processes and activities but treat purpose in different ways. In the work system framework, the work system exists for creating products and services for customers. In the service value chain framework, value for the customer is coproduced by the provider and the customer.

Taking Customers and Coproduction Seriously in Systems Analysis and Design

In contrast to typical analysis and design approaches that emphasize data, workflows, and technology, viewing systems as services emphasizes customer value, the customer experience, and the customer's shared responsibility for producing whatever a work system produces and attaining value from it. It treats customers as coproducers, integral parts of the system being studied, rather than just users of whatever the system produces. In particular, the service value chain framework highlights the importance of recognizing customer responsibilities at each step in the

processes and activities. In contrast, typical systems analysis approaches for IS emphasize the provider's processes and information and assume that responsibilities and activities of a service system's customers are peripheral or irrelevant except when those activities use the provider's information system. Even the original work system method, was developed with the assumption that customers (except in self-service situations) are usually outside of the work system that produces products and services for their benefit. The inclusion of service responsibility tables leads to much more of a service emphasis.

Providing Synergy Between Different Ways of Looking at Systems

The work system framework and service value chain framework outline separate but related ways to look at systems in organizations. The work system framework includes products and services but says nothing specific about the form or nature of service. The service value chain framework focuses on generic processes related to services, service interactions, backstage and frontstage, and value capture, thereby reflecting typical situations in which service providers negotiate and provide services for service consumers. It makes no explicit reference to most of the elements of a work system. As demonstrated by comparing Tables 7 and 8 in Section VIII, analysis tools derived directly from each of the frameworks differ in focus (production vs. coproduction) but still attend to the processes and activities through which system participants perform work to generate value.

A number of synergies emerge as a result of using both frameworks in the same analysis. Using the work system framework to augment an analysis organized around the service value chain framework brings a wealth of concepts and analysis tools. Thinking about participants, information, technology, processes and activities, and environment typically raises important issues for understanding any service situation. The secondary layers beneath the work system framework provide additional useful ideas, such as work system principles, different types of work system changes, work system metrics, risk factors, stumbling blocks, and analysis techniques related to work systems. [Alter, 2006] that can be used in an analysis organized around the service value chain framework.

Conversely, concepts built into the service value chain framework provide ways to augment an analysis organized around the work system framework. Focusing on value coproduction reduces a common tendency to emphasize a service provider's view and deemphasize the consumer or customer's activities and responsibilities. The generic service steps in the service value chain framework are a reminder that topics such as negotiation, preparation, requests, and follow up should not be overlooked accidentally.

Articulation between the work system framework and service value chain framework can occur at different levels. For example, the entire service value chain for a particular service might be viewed and analyzed as a single work system. Alternatively, different subsystems in Figure 2 in Section VI (such as provider or customer preparation) might be analyzed as separate work systems.

Augmenting Tool-Oriented Methods with Service System Metaphors and Tools

Much of the IS field emerged around a tool-centric approach focusing on building tools for users. Accordingly, much of the IS field focuses on processes of building tools, detailed specifications of tools, usage of tools, and adoption of tools.

There is nothing wrong with tool-centric approaches, which are essential for building well-engineered tools and interfaces. For our purposes, the point is that viewing systems as services (for the customers of the tool users) can complement tool-centric approaches by providing analysis topics and design questions that otherwise might be ignored or downplayed.

Important complementarities occur in the following areas:

Solution of technical vs. business problems. Viewing a system as service is a more natural and direct starting point for describing and solving business problems. A tool-centric approach is a more natural approach for creating and improving a technical artifact. Both approaches are needed in most situations.

Analyst's job. When viewing a system as service, an analyst focuses on both the production process and the process by which the customer attains value from whatever the system produces. With tool-centric approach, the analyst focuses more on eliciting and perfecting requirements that technical artifacts might satisfy. Both approaches are needed in most situations.

Nature of the solution. The system as service approach views the solution to an analysis and design problem as the service system that performs the work that fulfills customer needs. A tool-centric approach views the solution as

the tool that might be used to do that work. The tool without the service system has little meaning or usefulness; conversely, the service system won't work effectively without the tool.

Nature of implementation. In a system as service approach, implementation is the change from the old system of coproducing value to the new system of coproducing value. Thus, viewing systems as services extends the work system method's previous view of implementation as the change from the old system of doing work to the new system of doing work. Both the system as service approach and the previous work system approach differ from a tool-centric approach, in which implementation is the initial adoption of the new tool. That initial adoption is often within a work context that may require many other changes that are viewed as an externality beyond the scope of the system.

Making Service-Related Design Choices More Visible in Analysis and Design Efforts

The design of any system in an organization involves big picture design choices about variables such as the degree of structure, complexity, rhythm, and treatment of exceptions and errors. The standard systems analysis literature says little or nothing about big picture design choices such as these, in effect assuming that big picture design choices are either irrelevant or relatively obvious. Use of the service value chain framework and the concept of customer-centricity highlight additional service-related design choices, such as coproduction balance and service interaction intensity. Service-related design choices should be included in analysis checklists and considered in depth if they are important in a specific analysis situation.

Improving Communication with Business Professionals

IT professionals focusing on the current or future use of hardware and software sometimes find it difficult to interact with business professionals around business topics. Business professionals focus on doing their work, serving their customers, producing business results, and achieving personal goals. They are far more able to interact knowledgably around those topics than around the capabilities and features of software and hardware.

Most modeling techniques used in tool-centric analysis and design approaches are based on general concepts related to data, processes, and technology needed to produce reliable computer applications. These concepts are not ideal for helping business professionals visualize systems and system-related problems and issues in the business realm. The work system method evolved over many years with the goal of promoting more active participation by incorporating business ideas into a larger part of the analysis. The addition of the service value chain framework, customer-centricity, service responsibility tables, and a variety of design dimensions related to service is a further step in the same direction.

Providing a Common Denominator for Talking About Services

Computing trends toward web services and service-oriented architectures seem far removed from business-oriented views of service systems. Nonetheless, business services are increasingly computerized, componentized, and outsourced. The service value chain and related concepts are a step toward bridging the gap between business and computer science views of services.

As a preliminary example[3], consider results produced by Umapathy and Purao [2007], who organized standards from three different initiatives related to web services (W3C, Semantic web services, and ebXML) using a reference model for classifying web services standards. Concepts in the service value chain framework map into most of the terms in their framework, such as contract establishment, proposal and negotiation, capability search, capability exposure, guarantee, and messaging. Research is needed to develop mappings between the service value chain framework and the functions including within various SOA-related standards. The result would provide greater clarity about conceptual links between visible service functions performed by people, automated service functions performed by computers under direct human control, and totally automated service infrastructure capabilities.

X. CHALLENGES FOR FUTURE RESEARCH

Adding a system-as-service viewpoint to the existing ideas and methods in the IS field presents challenges for future research.

The service value chain framework and service responsibility tables have received only preliminary classroom testing in business schools. Testing in industry situations is required to determine whether those ideas and other ideas related to service-dominant logic are truly useful to business and/or IT professionals. Ideally, SRTs and similar

[3] Source: Alter [2008b].

tools and methods support reasonably direct linkages to UML or other heavyweight methods. Research about this topic is only beginning, and only a few preliminary guidelines for those linkages have been proposed [Tan et al., 2008].

Viewing systems as services (and other aspects of the work system approach) should be used to explore and possibly reinterpret many of the results from prior research on the business value of IT. For example, findings about correlates of success or failure for many IT initiatives may be explained in terms of the extent to which users and developers viewed specific initiatives as work system or service system initiatives rather than as IT initiatives.

Finally, the ideas in both the work system approach and its extension to thinking of systems as services should provide a way to analyze the content of the user participation and involvement that have proven so difficult over the years. It would be interesting to see whether fuller, more wholehearted participation and involvement occurs when a system is viewed as a service rather than as a technical artifact.

REFERENCES

Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. The author(s) of the Web pages, not AIS, is (are) responsible for the accuracy of their content.
4. The author(s) of this article, not AIS, is (are) responsible for the accuracy of the URL and version information.

Ackoff, R.L., and F.E. Emery (1972) *On Purposeful Systems*, Chicago, IL: Aldine-Atherton.

Alter, S. (2003) "18 Reasons Why IT-Reliant Work Systems Might Replace the IT Artifact as the Core Subject Matter of the IS Field", *Communications of the Association for Information Systems* (12)23, pp. 365–394.

Alter, S. (2004) "Desperately Seeking Systems Thinking in the IS Discipline", *Proceedings of ICIS-25, the International Conference on Information Systems*, Washington, DC, pp. 757–769.

Alter, S. (2006) *The Work System Method: Connecting People, Processes, and IT for Business Results,* Larkspur, CA: Work System Press.

Alter, S. (2007a) "Service Responsibility Tables: A New Tool for Analyzing and Designing Systems", *AMCIS 2007—Americas Conference on Information Systems*, Keystone, CO.

Alter, S. (2007b) "Customer-Centric Systems: A Multi-Dimensional View", *Proceedings of WeB 2007, Sixth Workshop on eBusiness* (Dec. 9, 2007), Montreal, Canada, pp. 130–141.

Alter, S. (2008a) "Defining Information Systems as Work Systems: Implications for the IS Field", *European Journal of Information Systems* (17)5, pp. 448–469.

Alter, S. (2008b) "Service System Fundamentals: Work System, Value Chain, and Life Cycle", *IBM Systems Journal*, (47)1, pp. 71–85.

Alter, S. (2009) "Project Collaboration, Not Just User Participation", *AMCIS 2009—Americas Conference on Information Systems*, San Francisco, CA.

Benbasat, I., and R. Zmud (2003) "The Identity Crisis Within the IS Discipline: Defining and Communicating the Disciplines' Core Properties", *MIS Quarterly* (27)2, pp. 183–194.

Booch, G., I. Jacobson, and J. Rumbaugh (2000) *OMB Unified Modeling Language Specification*, *Version 1.3, 1st edition,* http://www.omg.org/docs/formal/00-03-01.pdf.

Brown, A.W., et al. (2005) "Realizing Service-Oriented Solutions with the IBM Rational Software Development Platform", *IBM Systems Journal* (44)4, pp. 727–752.

Carlzon, J. (1989) *Moments of Truth*, New York, NY: Harper Collins.

Checkland, P. (1999) *Systems Thinking, Systems Practice* (Includes a 30-year retrospective), Chichester, UK: John Wiley & Sons.

Churchman, C.W. (1979) *The Systems Approach*, revised and updated, New York: Dell Publishing.

Cherbakov, L., et al. (2005) "Impact of Service Orientation at the Business Level", *IBM Systems Journal* (44)4, pp. 653–668.

Chesbrough, H., and J. Spohrer (2006) "A Research Manifesto for Services Science", *Communications of the ACM* (49)7, pp. 35–40.

Cullen, S., P. Seddon, and L. Willcocks (2005) "Managing Outsourcing: The Life Cycle Imperative", *MIS Quarterly Executive,* pp. 229–246.

Czepiel, J.A., M.R. Solomon, and C.F. Surprenant (eds.) (1985) *The Service Encounter: Managing Employee/ Customer Interaction in Service Businesses*, Lexington, MA: Lexington Books, D.C. Heath and Company.

Fitzsimmons, J.A., and M.J. Fitzsimmons (2006) *Service Management, 5th edition,* New York: McGraw-Hill.

Hill, C., et al. (2006) "Beyond Predictable Workflows: Enhancing Productivity in Artful Business Processes", *IBM Systems Journal* (45)4, pp. 663–682.

Horn, P. (2005) "The New Discipline of Services Science", *BusinessWeek* (Jan. 21) http://www.businessweek .com/technology/content/jan2005/tc20050121_8020.htm.

IBM Research (2010) "Services Sciences, Management and Engineering", http://researchweb.watson.ibm .com/ssme/services.shtml (current Jan. 16, 2010).

IfM and IBM (2008) "Succeeding Through Service Innovation: A Service Perspective for Education, Research, Business and Government", Cambridge, United Kingdom: University of Cambridge Institute for Manufacturing, ISBN: 978-1-902546-65-0. http://www.ifm.eng.cam.ac.uk/ssme/documents/080428ssi_us_letter.pdf.

Ing, D. (2008) "Coproduction, Interactive Value, Offering, Value Constellation, blog posting, May 15, http://coevolving .com/blogs/index.php/archive/coproduction-interactive-value-offering-value-constellation/.

Kotler, P., and K. Keller (2006) *Marketing Management, 12th edition,* Upper Saddle River, NJ: Prentice Hall.

King, J.L., and K. Lyytinen (2006) "The Market of Ideas as the Center of the IS Field", *Communications of the AIS* (17), pp. 841–850.

Leavitt, T. (1960) "Marketing Myopia", *Harvard Business Review* (38)4, pp. 45–56.

Markus, M.L., and J.-Y. Mao (2004) "Participation in Development and Implementation—Updating An Old, tired Concept for Today's IS Contexts", *Journal of the Association for Information Systems* (5)11, pp. 514–544.

Normann, R., and R. Ramirez (1994) *Designing Interactive Strategy: From Value Chain to Value Constellation,* Chichester, England: Wiley.

Petrie, D. (2004) *Understanding the Impact of Technological Discontinuities on Information Systems Management: The Case of Business-to-Business Electronic Commerce,* Ph.D. Thesis, Claremont Graduate University.

Petkov, D., and O. Petkova (2006) "The Work System Model as a Tool for Understanding the Problem in an Introductory IS Project", *Proceedings of ISECON 2006*, Dallas, TX.

Porter, M.E., (1985) *Competitive Advantage*, New York: The Free Press.

Prahalad, C.K., and V. Ramaswamy (2004) *The Future of Competition: Co-Creating Unique Value with Customers*, Boston, MA: Harvard Business School Press.

Rai, A., and V. Sambamurthy (2006) "Editorial Notes—The Growth of Interest in Services Management: Opportunities for Information System Scholars", *Information Systems Research* (17)4, pp. 327–331.

Ramirez, R., and J. Wallin (2000) *Prime Movers: Define Your Business or Have Someone Define It Against You,* Chichester, England: Wiley.

Robey, D. (1996) "Diversity in Information Systems Research: Threat, Promise, and Responsibility", *Information Systems Research* (7)4, pp. 400–408.

Sampson, S.E., and C.M. Froehle (2006) "Foundations and Implications of a Proposed Unified Services Theory", *Production and Operations Management* (15)2, pp. 329–343.

Spohrer, J., et al. (2007) "Steps Toward a Science of Service Systems", *IEEE Computer*, pp. 71–77.

Tan, X., S. Alter, and K. Siau (2008) "Integrating Lightweight Systems Analysis into the Unified Process by Using Service Responsibility Tables", *AMCIS 2008—Americas Conference on Information Systems*, Toronto, Canada.

Teboul, J. (2006) *Service Is Front Stage: Positioning Services for Value Advantage*, INSEAD Business Press, Palgrave MacMillan, UK.

Truex, D.P. and S. Alter (2010) "Systems Analysis for Everyone Else: Empowering Business Professionals Through a Systems Analysis Method That Meets Their Needs", accepted for presentation at *ECIS 2010, European Conference on Information Systems*, Pretoria, South Africa.

Umapathy, K., and S. Purao (2007) "A Theoretical Investigation of the Emerging Standards for Web Services", *Information System Frontiers* (9)1, pp. 119–134.

Vargo, S.L., and R.F. Lusch (2004a) "Evolving to a New Dominant Logic for Marketing", *Journal of Marketing* (68), pp. 1–17.

Vargo, S.L., and R.F. Lusch (2004b) "The Four Service Marketing Myths", *Journal of Service Research* (6)4, pp. 324–335.

Wikipedia (2008a) "Glossary of Unified Modeling Language Terms", http://en.wikipedia.org/wiki/Glossary_of_Unified_Modeling_Language_terms (current Oct. 20, 2008).

Wikipedia (2008b) "Information Technology Infrastructure Library", http://en.wikipedia.org/wiki/ITIL (current Oct. 31, 2008).

Wood, J.B. (2007) "Major Service Challenges Facing Technology Companies in 2007", Presentation at the Sixteenth Annual Frontiers of Service Conference, San Francisco, CA, October 4–7, http://www.rhsmith.umd.edu/ces/presentations2007.html.

Zhao, J.L., T. Tanniru, and J.-L. Zhang (2007) "Services Computing as the Foundation of Enterprise Agility", *Information System Frontiers* (9)1, pp. 1–8.

ABOUT THE AUTHOR

Steven Alter is Professor of Information Systems at the University of San Francisco. He received his B.S. and Ph.D. at MIT. His research for the last decade has concerned developing systems analysis concepts and methods that can be used by typical business professionals and can support communication with IT professionals. His 2006 book, *The Work System Method: Connecting People, Processes, and IT for Business Results*, is a distillation and extension of ideas in 1992, 1996, 1999, and 2002 editions of his information system textbook. His articles have been published in *Harvard Business Review, Sloan Management Review, MIS Quarterly, IBM Systems Journal, European Journal of Information Systems, Decision Support Systems, Interfaces, Communications of the ACM, Communications of the Association for Information Systems*, *CIO Insight*, and many conference proceedings.

Communications of the Association for Information Systems

ISSN: 1529-3181