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MOVING TOWARD A SERVICE METAPHOR FOR DESCRIBING, EVALUATING, AND DESIGNING SYSTEMS

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Abstract

This paper explores possible steps toward incorporating the increasingly important topics of service and service systems into the core of the IS field, thereby moving toward a service-oriented core without abandoning existing tool-oriented concepts and methods. Incorporating more of a service mindset into IS would add to the many service-related topics that it already contains. A service mindset would focus more on customer activities and concerns within the analysis of IT-reliant work systems. Following the lead from developments in marketing and operations, it would emphasize customer-centricity and the co-production of value by service providers and customers. It would encourage greater attention to customer concerns, rather than mostly user concerns, in the implementation of IT-reliant work systems. This paper presents frameworks and related tools that provide an indication of what a more service-oriented IS field might look like.

Keywords: Service, Service system, Work system, Service value chain, Customer-centricity

1 INTRODUCTION: WOULD THE INFORMATION SYSTEMS FIELD BENEFIT FROM A SERVICE METAPHOR?

The IS field is in trouble. Enrollments are low. Required courses in IS have been dropped at some business schools and are viewed as questionable at others. Increasingly we need to train students to be partners with business professionals, implementers of commercial software packages, and managers of outsourcing and offshoring. Motivated by the fact that over 50% of the revenue of technology companies comes from services (Wood 2007), IBM and other leading technology companies initiated a widely publicized effort to develop a science of services (Chesbrough and Spohrer 2006, Spohrer et al 2007) and university programs in SSME (service science, manufacturing, and engineering). Computer science and the existing IS field are included in SSME, but service is the central issue.

This paper explores possibilities for incorporating more of a service focus in the IS field. Short of allying itself totally with a not yet established science of services, the IS field might still incorporate much more of a service focus into basic concepts and research. It already contains many topics whose names include the term *service*, such as customer service, web services, service-oriented architectures, IT services by IT groups, and use of the service quality questionnaire SERVQUAL for evaluating IT groups. Important topics involving actions and designs influenced by customers or users range from agency theory and stakeholder theory through user-centered design and CRM. While maintaining its focus on IT and IT-reliant systems, the IS field can borrow ideas from operations and marketing, such as the “voice of the customer” and “quality function deployment.”

Assume the IS field made service a core concept for describing, evaluating, and designing IT-reliant systems. What would that look like, and what might be the potential benefits? Incorporating a service metaphor into the heart of the IS field would involve moving from a tool-oriented core toward a service-oriented core. The IS field would place additional weight on customer activities and concerns within the analysis of IT-reliant work systems. It would evaluate IT-reliant work systems in terms of customer-centricity. It would include a service metaphor in the implementation of IT-reliant work systems. This paper’s contribution involves demonstrating the types of frameworks and tools that lead toward using a service metaphor in evaluating, designing, and implementing IT-reliant systems. Progress in that direction might help the IS field increase its popularity for students and employers.

2 DEFINITION OF SERVICE

There is surprisingly little agreement about the definition of service. Debates about the definition stem from difficulties distinguishing between goods (often called products) and services. Most marketing books bypass this issue by saying that offerings to customers often combine product and service features. Researchers in marketing, operations, and computer science discuss and analyze services from vastly different viewpoints. For example, interactions with human customers are often viewed as the essence of service. As noted by Glushko (2007), however, traditional service concepts emphasizing the customer’s subjective experience of person-to-person service encounters are less important for highly automated services (e.g., web-based mortgage brokers), back office services (producing tax returns or generating research reports), computer-to-computer services (e.g., remote monitoring of equipment or automatic backups) and self-service situations (e.g., using an ATM).

Many recent attempts to define the essential characteristics services focus on different factors. The 12th edition of a leading marketing textbook says 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) The 5th edition of a service management text says, “a service is a time-perishable, intangible experience performed for a customer acting in the role of a coproducer.” (Fitzsimmons and Fitzsimmons 2006) To the contrary, Vargo and Lusch (2004b) 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.” A literature survey attempting to differentiate services from goods concluded, “with service processes, the customer provides significant inputs into the production process.” (Sampson and Froehle 2006)

We define services as acts performed for others, including the provision of resources that others will use. Although not part of the definition, we reflect the views of many service researchers by assuming that services tend to be co-produced by providers and customers because most services involve at least some degree of participation by internal and/or external customers. Co-production of value by providers and customers occurs on different levels, including:

- Customer provides a request for service (minimal level of co-production)
- Customers are involved in some aspects of a service fulfillment process (beyond just specifying what is needed)
- Providers perform the service largely or completely through service interactions that include extensive, 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.

3 FROM A TOOL METAPHOR TO A SERVICE METAPHOR

Table 1 (an extension of Table 1 in Alter (2004)) provides a step toward a service metaphor by comparing three views of systems in organizations. In a tool view, the headline is the tool that is being used; a system view focuses on a system of doing something; a service system view focuses on doing something for a customer. With a tool view, the people are users of the tool; a system view treats people in the provider organization as participants in the system; a service system builds on the system view by assuming that service providers and service consumers co-produce value.

Because all services of significance are produced by service systems, moving toward a service metaphor involves moving toward a service system view. This additional step brings the customer into the analysis in a more active and direct manner than might occur in a typical system analysis. The next two sections show how use of the work system framework, service value chain framework, and the concept of customer-centricity are steps toward a service metaphor.

4 WORK SYSTEMS AS SERVICE SYSTEMS

This section defines “work system” and explains why work systems can be viewed as service systems.

Work systems. Alter (2003) argues that IT-reliant work systems are the core subject matter of the IS field. 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 services for internal or external customers. (Alter 2003, 2004, 2006, 2008) Typical work systems include systems for finding new customers, creating production schedules, acquiring supplies, providing service through a call center, providing medical care, designing new products, and generating financial statements. Almost all significant work systems in today’s organizations are IT-reliant.

Service systems. Service systems are work systems that produce services for internal or external customers. All of the systems in the previous paragraph are service systems because they invoke the definition of service, performing acts for others, including the provision of resources that others will use. This definition of service system is not obvious. For example, a recent paper by service research leaders defined a service system as “a dynamic value co-creation configuration of resources, including people, organizations, shared information (language, laws, measures, methods), and technology, all connected internally and externally to other service systems by value propositions. (Spohrer et al

(2008), p. 5). Another recent paper by Mathiassen & Sørensen (2007) looks organizational information services, a type of service that provides information on demand to mobile employees and others with transient information needs. An IS field focusing on service systems would include organizational information service and many other types of services, such as the ones mentioned along with the definition of work system.

Viewing work systems as service systems. Vargo and Lusch's (2004a) note that the concept of service "is applicable to all marketing offerings, including those that involve tangible output (goods) in the process of service provision" because "goods are distribution mechanisms for service provision." Based on this clarification about tangible outputs, all work systems, even those that produce physical things, can be viewed as service systems.

	<i>Tool View</i>	<i>System View</i>	<i>Service System View</i>
Headline	The tool that is used	The system of doing something	Co-production of value for the customer
Role of people	Users of the tool	Participants in the system of producing something	Co-production of value for the customer
Information	Whatever information is stored or processed by the tool	Codified or non-codified information is produced or used by the system	Codified or non-codified information is produced or used by the service 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.	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 who receive and use whatever the system produces.	People at whom the service is directed; they usually co-produce value for themselves
Scope of the system	The system is the tool.	The system is the system of doing work. Customers may or may not be viewed as system participants.	Customers should usually be viewed as system participants because most services are at least somewhat co-produced
Performance indicators related to operation	Measure how well the tool operates and how well it is used.	Measure how well the system operates internally and how good are the products and services it produces	Measure how well the system operates internally and how good are the products and services it produces
Typical metrics	User satisfaction, uptime, ease of use, % of features that are used, energy usage	Internal: efficiency, speed, consistency, output rate External: customer satisfaction, cost to customer, quality perceived by customer, conformance to standards	Provider metrics: efficiency, speed, consistency, output rate Customer metrics: customer satisfaction, cost to customer, quality perceived by customer, conformance to standards
Life cycle model	A project-oriented model related to defining, creating or acquiring, and installing the tool	Evolutionary model in which the system is created and then evolves through iterations of system-in-operation, initiation of changes, development efforts, and implementation of changes in the organization.	Evolutionary model in which the service system is created and then evolves through iterations of system-in-operation, initiation of changes, development efforts, and implementation of changes in the organization.
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 sociotechnical system, assuming that technical and social issues may be intertwined.	Create or improve a sociotechnical system, assuming that technical and social issues may be intertwined, and may involve both providers and customers

Table 1: Comparing tool, system, and service system views of systems in organizations

Work System Framework. Any work system can be analyzed using the work system framework (Figure 1), which was developed to help business professionals recognize and understand IT-reliant systems in organizations. This framework emphasizes business rather than IT concerns. It identifies nine elements that are part of even a basic understanding of a work system. Of those nine elements, only four, the processes and activities, participants, information, and technologies are part of the work system per se. The other five elements must be understood to comprehend the work system fully.

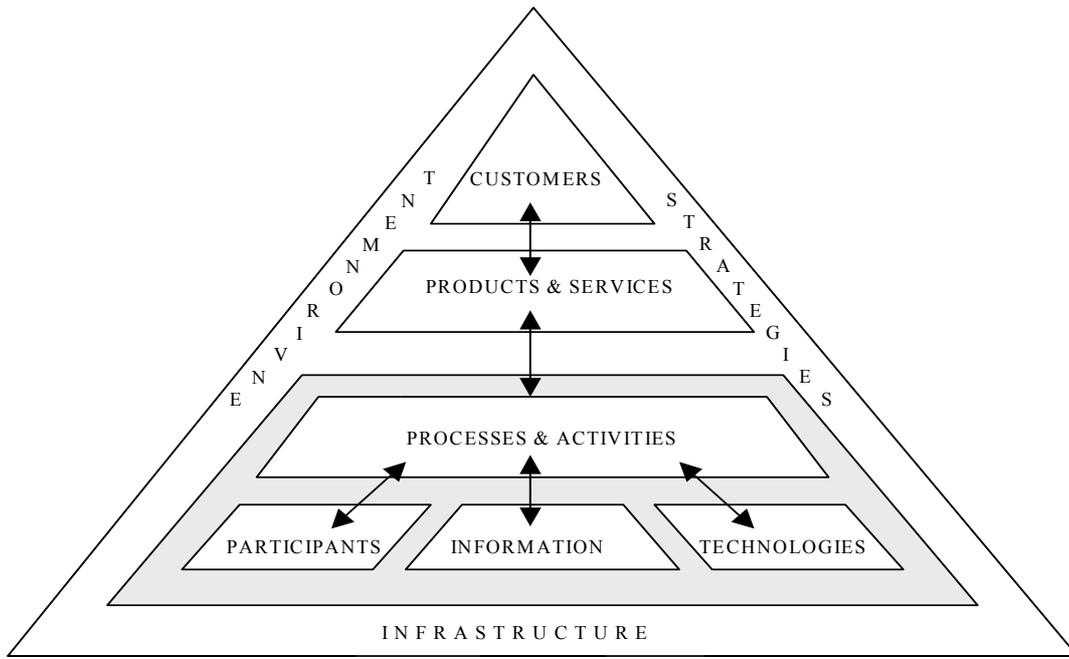


Figure 1. The Work System Framework (slightly updated). (Alter 2006, 2008)

The location of the customer at the top of the work system framework keeps the customer visible in any summary or analysis of a work system. It is possible to go a step further by asking whether the work system is customer-centric.

Customer-centricity of work systems. Applying the idea of customer-centricity to work 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 work system's customer-centricity. For example, a work system's customer-centricity might be increased by customizing the products and services it produces, by changing the process to accentuate co-production, by personalizing the technology used, or by using customer information more effectively.

In general, a customer-centric work system might be defined as a work system that recognizes and responds fully to customer needs. (Alter 2007b). It is more useful, however, to view customer-centricity as a multi-dimensional construct rather than a binary, yes/no construct. Table 2 lists 12 dimensions of customer-centricity related to specific elements of work system.

The dimensions in Table 2 were chosen based on the assumption that each of them contributes to the likelihood that a work system will recognize and respond fully to customer needs. Exceptions such as specific work systems whose customers do not care about customized products and services do not undermine the independent association of each dimension with greater customer-centricity. A work 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 work system's customer-centricity or as an aid in designing or improving a work system.

<i>Work system element</i>	<i>Dimension</i>
Customer	<ul style="list-style-type: none"> • Recognizing and responding fully to customer needs • Providing a satisfying customer experience
Products and services	<ul style="list-style-type: none"> • Producing customized products and services
Processes and activities	<ul style="list-style-type: none"> • Personalizing or customizing processes and activities • Using customer information to maximize benefits for customers • Relying on co-production or self-service by customers
Participants	<ul style="list-style-type: none"> • Non-customer participants recognize and emphasize customer needs and priorities
Information	<ul style="list-style-type: none"> • Availability of customer-related information to maximize benefits for customers
Technology	<ul style="list-style-type: none"> • For any technology used by customers, personalization or conformity to customer work practices, standards, terminology, convenience, or tastes.
Infrastructure	<ul style="list-style-type: none"> • Avoidance of interfering with or operating incompatibly with relevant aspects of the customer's infrastructure.
Environment	<ul style="list-style-type: none"> • Operating consistent with the customer's environment wherever the customer is involved with co-production
Strategy	<ul style="list-style-type: none"> • Producing products and services that are consistent with the customer's strategies.

Table 2: *Dimensions of customer-centricity in work systems.*

5 SERVICE VALUE CHAIN

The service value chain framework (Figure 2) augments the work system framework by introducing activities and responsibilities associated with services. Each element of this framework is important for many service systems, but certainly not all service systems. The entire service value chain for a service might be viewed and analyzed as a single work system. Alternatively, different subsystems in Figure 2 (such as provider or customer preparation) might be analyzed as separate work systems.

The form and content of the service value chain framework incorporate a number of ideas that are often associated with services, such as:

- ***Co-production of value.*** Understanding services requires attention to activities and responsibilities of both service providers and service customers.
- ***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.
- ***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.
- ***Preparation.*** Preparation by providers and/or customers prior to each instance of service delivery is often essential for service efficiency and effectiveness.
- ***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.
- ***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.

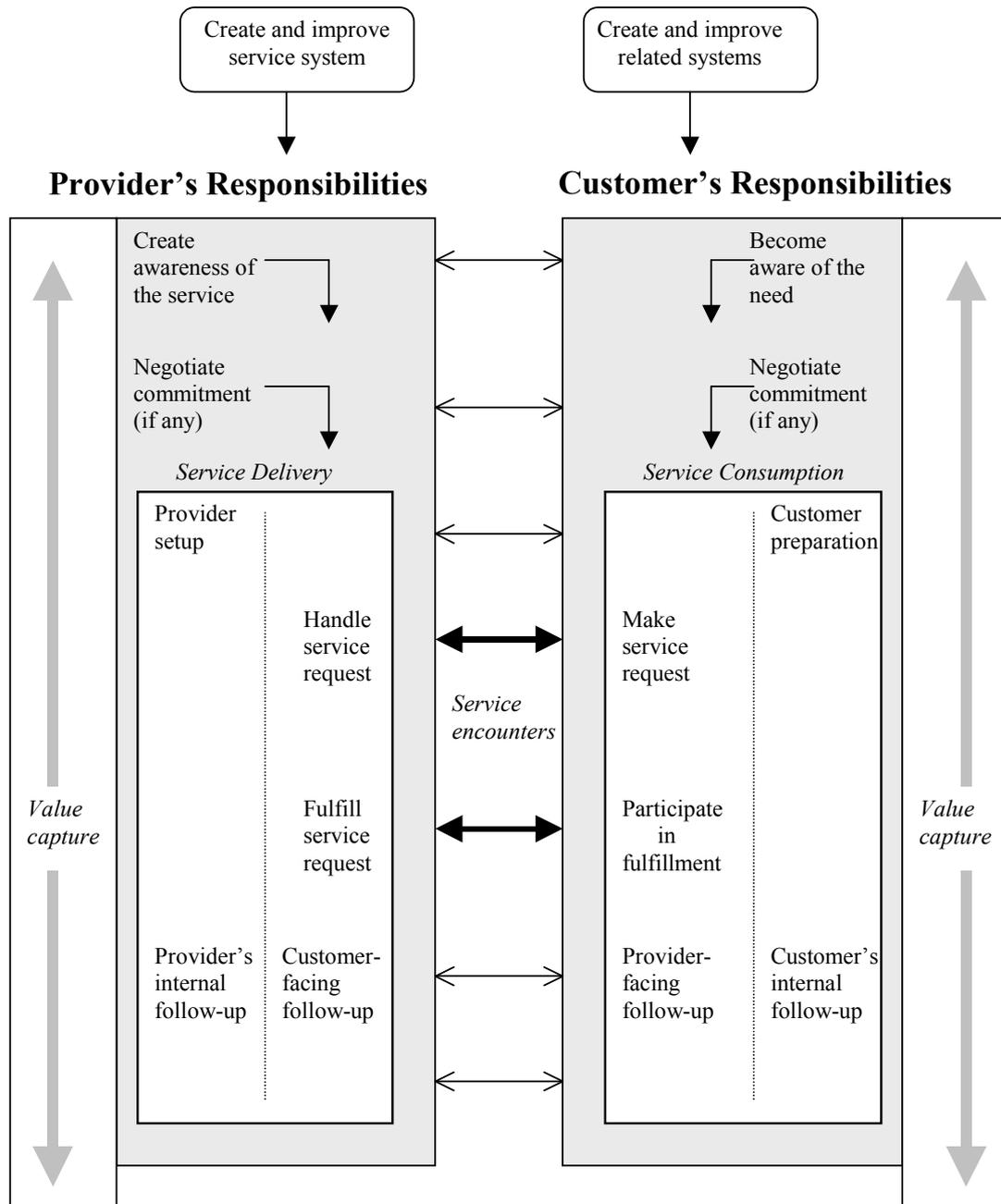


Figure 2: Service Value Chain Framework (Alter 2007a, 2008) (slightly updated)

The inclusion of service concepts within the service value chain framework leads to characterizations of service systems that augment typical characterizations and metrics for work systems in general. For example, terms such as complexity, resilience, speed, and efficiency can be used to describe any work system. Additional characterizations specifically relevant to service systems include the relative balance of responsibilities between providers and customers, the relative importance of commitments

that govern instances of service delivery, and the relative amount of effort that goes into back-stage preparation versus front-stage customer interactions.

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 3 presents 10 customer-centricity dimensions related to those phases. The dimensions in Table 3 are not as broadly applicable as those in Table 2 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 3 has value, nonetheless, because it suggests areas in which a work system’s customer-centricity might be improved. As with the dimensions in Table 2, it is possible to convert each dimension into a question that can be used to evaluate work system on a 0 to 3 or 0 to 7 scale.

<i>Phase</i>	<i>Dimension</i>
Awareness	<ul style="list-style-type: none"> • Making the customer aware of the availability, scope, and significance of the service
Commitment	<ul style="list-style-type: none"> • Providing a comfortable and mutually effective process of negotiating any commitments that are relevant to subsequent service provision
Preparing	<ul style="list-style-type: none"> • Preparing for specific instances of service delivery • Making it easy and convenient to the customer to perform for any necessary preparations
Requesting service	<ul style="list-style-type: none"> • Providing a comfortable and mutually effective process through which the customer can make and the provider can respond to requests related to a specific service instance
Fulfilling the request	<ul style="list-style-type: none"> • Performing the work that fulfills the request • Making the customer’s participation in the fulfillment phase comfortable and effective.
Follow-up	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Assuring that service encounters that occur through the service value chain are performed professionally and effectively

Table 3: *Dimensions of customer-centricity related to the service value chain framework*

6 TOOLS FOR MAKING SERVICE CONCEPTS VISIBLE IN SYSTEMS ANALYSIS AND DESIGN

Bringing a service metaphor to the foreground in systems analysis and design shifts the frame of reference in a way that might generate significant new insights during the analysis of some systems. The basic terminology of the IS field implies that systems are tools that are “used” by “users” through “user interfaces.” Systems analysis tools such as flow charts, DFDs, and ERDs tend to focus attention on provider activities and on technical artifacts that are being built, rather than on co-production of value. UML encourages emphasis on “use cases,” and therefore emphasizes the use of technical artifacts that are being built or improved. By implication, a systems analyst’s job is to elicit and perfect the requirements that technical artifacts should satisfy. In contrast, an analysis approach emphasizing the co-production of value through processes and activities treats the customer as part of the system and focuses attention on the complementarity between customer and provider responsibilities.

The definition of service, the work system framework, the service life cycle model, and customer-centricity can be used when describing, analyzing, and designing IT-reliant systems. Three related tools are work system snapshots, service responsibility tables, and customer-centricity evaluations.

Work system snapshot. The work system framework is the basis of a work system snapshot, which summarizes a work system on a single page by identifying its customers, products and services, work practices, participants, information, and technology. At the beginning of an analysis, creating and discussing a work system snapshot can be useful in clarifying and attaining agreement about the scope and purpose of the work system that is being analyzed. The 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 4 shows a work system snapshot related to a hypothetical loan application and underwriting system that combines functional characteristics from a number of different real world systems (Alter 2006).

Customers		Products & Services			
<ul style="list-style-type: none"> • Loan applicant • Loan officer • Bank’s Risk Management Department and top management • Federal Deposit Insurance Corporation (FDIC) 		<ul style="list-style-type: none"> • Loan application • Loan write-up • Approval or denial of the loan application • Explanation of the decision • Loan documents 			
Major Activities or Processes					
<ul style="list-style-type: none"> • Loan officer identifies businesses that might need a commercial loan. • Loan officer and client discuss financing needs and discuss possible terms of the proposed loan. • Loan officer helps client 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	
<ul style="list-style-type: none"> • Loan officer • Loan applicant • Credit analyst • Senior credit officer • Loan committee • Loan administration clerk • Real estate appraiser 		<ul style="list-style-type: none"> • Applicant’s financial statements • Financial and market projections • Loan application • Loan write-up • Explanation of decision • Loan documents 		<ul style="list-style-type: none"> • Spreadsheet consolidating information • Loan evaluation model • MS Word template • Internet • Telephones 	

Table 4: Work system snapshot for a loan application and underwriting system

Service responsibility table. The two-sided format of the service value chain leads to a useful and flexible analysis tool called a service responsibility table (SRT). As shown in the first two columns of Table 5, the simplest form of SRT is a two-column swimlane diagram, with one column for providers and one column for customers, and with specific provider and customer roles indicated clearly. All of the entries in the first two columns of Table 5 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 new column for any of a number of topics that might be important for analyzing a particular system. The third column in Table 5 associates problems or issues with either a specific step or the work system as a whole. An additional row for the entire service system (see the

row near the top of Table 5) can summarize metrics for the entire system (such as total cycle time or total capacity) or issues for the entire system (such as participant burnout or overall customer satisfaction). As explained in Alter (2007a, 2008), many additional topics can be included in 3rd or 4th rows of SRTs as the analysis of a service system continues.

<i>Provider Activity or Responsibility</i>	<i>Customer Activity or Responsibility</i>	<i>Problems or Issues</i>
<i>System as a whole</i>		<ul style="list-style-type: none"> • Inadequate profitability of the bank • Questions about whether incentives of the bank are aligned with incentives of system participants.
Loan officer identifies businesses that might need a commercial loan.		<ul style="list-style-type: none"> • Loan officers are not finding enough leads.
Loan officer contacts potential loan applicant.	Potential loan applicant 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.	<ul style="list-style-type: none"> • Loan officer is not able to be specific about loan terms, which are determined during the approval step that occurs later.
Loan officer helps loan applicant compile a loan application	Loan applicant compiles loan application.	<ul style="list-style-type: none"> • Loan applicant and loan officer sometimes exaggerate the applicant's financial strength and prospects.
Loan officer and senior credit officer meet to verify the loan application has no glaring flaws.		<ul style="list-style-type: none"> • 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.		<ul style="list-style-type: none"> • 10% rate of significant errors, partly due to an error prone combination of several spreadsheets and a word processing program. • Much rework due to inexperience of credit analysts.

Table 5: *Three-Column Service Responsibility Table (SRT) for a Loan Approval System (abbreviated due to space constraints)*

Customer-centricity evaluation. A third type of tool is a customer-centricity evaluation based on the dimensions of customer-centricity in Tables 2 and 3. As mentioned previously, each topic in those tables can be evaluated on a numerical scale as part of the analysis of a work system.

7 APPLYING A SERVICE METAPHOR IN SYSTEM IMPLEMENTATION

In many system implementation situations, greater attention to service-related topics mentioned above would elevate a number of issues that are often underplayed or ignored. Consider implementation steps such as implementation planning, training, and conversion to the new system.

Implementation planning. Traditional implementation planning focuses on how to convert from a current way of doing work to a new way of doing work. With greater attention to service issues, implementation planning would ask how each group of customers for the work system's products and services will capture value more effectively as a result of the new or improved system. Focusing on value capture (see Figure 2) would broaden the scope of the planned implementation effort or,

alternatively, would clarify that value capture by the customers is outside of the scope of the implementation plan.

Training. If value capture by customers is to increase, the training should help the work system's customers understand how to capture value from the system's products and services. Typical training topics would still be covered, such as specification of procedures, definition of terms, details of using hardware and software, and, in some cases, a big picture view of how the new system will operate differently from the old system. Training more attuned to service would also cover capture value by customers and providers and how aspects of the work system do or do not support value capture.

Conversion. The process of converting to the new or improved work system would cover the same mechanical issues as are typically covered today. A process more attuned to service would extend conversion to include conversion to new forms of value capture by the work system's customers. At minimum, it would confirm that the new capabilities would have desired effects on value capture.

8 CONCLUSION: EMBRACING A SERVICE METAPHOR

A tool-oriented metaphor of technologies, users, usage patterns, user-satisfaction, technology adoption, and tool-building dominates the current IS field. An alternative metaphor of people, work, and organizations provides many useful insights from different focal points and assumptions, but is sometimes difficult to integrate with a tool-oriented approach. Although both approaches are valid in practice and important for research, the IS field is suffering because neither approach is attracting enough interest from students and enough respect and support from practitioners and non-IS faculty.

Service-related ideas. Ideas presented in this paper might help the IS field embrace a service metaphor that could resonate with interests and needs of students, business organizations, and practitioners.

- *Importance of service systems.* The vast majority of businesses are concerned with service for their customers. Most recognize that services are produced by service systems. Some recognize that internally-directed services are also produced by service systems for internal customers.
- *Work system framework.* This framework provides a way to think about IT-reliant systems as work systems rather than IT artifacts. It also leads to thinking of work systems as service systems. Its form, with the customer at the top, encourages focusing on the system's customers.
- *Service value chain framework.* This framework encourages recognizing that services are co-produced by service providers and service consumers, and recognizing the importance of value capture by customers and providers.
- *Customer-centricity.* A multi-dimensional construct, customer centricity describes the extent to which work systems are genuinely oriented toward the interests and needs of customers.

Co-production of value. Focusing on co-production of value puts greater emphasis on how the customer receives or attains value, rather than on how processes and activities are performed. Additional focus on co-production, plus the continuing exponential increase in the power of computers and networks leads to new possibilities of self-service and other innovative forms of service provision.

Multiple customers. Concern about service and co-production of value leads directly to questions about who is the customer. The customer of IS projects is often separate from any of the groups of customers of the system that is being improved. The interests and concerns of these different groups of customers may be quite different. Tool-oriented analysis that focuses on use cases and on the use of technology should be augmented by other forms of analysis that address value creation more fully and that address inconsistencies involving needs and concerns of different groups of customers.

Augment, not replace. Use of methods and tools based on these ideas would augment, and certainly would not replace, the use of current methods and tools directed at technical, procedural, and organizational issues. For example, regardless of how a service metaphor is used, information system projects will still need to specify process flows and information requirements, and will still need to design and test technical systems and documentation. Applying a service metaphor in a genuine way

would balance these more technical and procedural concerns with greater concern for how the new or improved system would provide greater benefits to its customers. Those benefits may be inherent in the use of improved tools or procedures, or they may involve subsequent customer activities that are currently viewed as beyond the scope of the system.

Moving toward a service mindset. A service mindset for the IS field would give higher weighting to customers, services for customers, and co-production of value. Those ideas exist in the current IS literature, but they are often overshadowed by concerns about technology and provider processes.

Use of ideas and tools that embody a service mindset is a step toward enhancing the IS field's contribution to business and society. This paper's brief summary of service-related ideas and tools hints at what a service-orientation might become in the IS field. The next steps in that direction are to develop and implement a series of new tools and methods for imagining, documenting, characterizing, creating, and improving IT-reliant work systems from a service perspective.

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(Note: Most of these recent references refer to many additional sources. Meaningful discussion of additional references would have exceeded this paper's length constraints.)

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