

## **A NEEDS ASSESSMENT MODEL FOR TELECOMMUNICATIONS MANAGERS**

**JEFFREY S. HARPER**

**ATHENS STATE COLLEGE**

**ROBERT G. LITTLE, JR.**

**AUBURN UNIVERSITY AT MONTGOMERY**

### **ABSTRACT**

Telecommunications (TC) technologies, such as networking and electronic data interchange, have been shown to positively contribute to organizational competitiveness. As managers have developed an awareness of the link between IT and key aspects of competitive positioning, TC technologies have become an important component in the business plan. Unfortunately, most firms are behind on linking TC and strategies. This research project culminated in the development of a needs assessment model designed specifically to assist managers with TC responsibilities in aligning an organization's TC needs and its strategy. This model can add structure to the process of providing the basis for an action plan, whereby organizational needs can be efficiently addressed in a cost-effective manner consistent with organizational goals and objectives.

### **INTRODUCTION**

Over the past decade, technological change, changes in market demands, deregulation of many service industries, and competitive globalization have had a substantial effect on the way firms do business [7]. Many organizations have turned to information systems (IS) in an effort to maintain a viable business posture in this dynamic environment.

Organizational information technology (IT) investments continue to grow at a rate substantially greater than economic growth [4, 25, 28], indicating that business managers recognize that effective implementation of an organization's information architecture can compress time and space and permit sharing of scarce corporate expertise [28]. IT has become an integral part of the strategic planning process in modern organizations [2, 14, 30]. As managers have developed an awareness of this link between IT and competitive positioning, telecommunications (TC) technologies have become an important component in the business plan. Firms are able to overcome many of the disadvantages associated with the geographic dispersion

of national or international units through the use of the connectivity provided by TC. TC technologies, such as networking and electronic data interchange, have also been shown to positively contribute to organizational competitiveness [6, 12, 16]. Unfortunately, most firms are behind on linking TC and strategies [27].

New TC technologies, products, and services are continuously emerging. Managers are experiencing the time compression of technological cycles between product generations. The rate of new product offerings has contributed to an ever-decreasing life cycle of systems, effectively reducing the service life of a system just a few years [10]. As a result, managers have less time than ever to make increasingly important decisions.

Managers of today's firms must support their organizations with telecommunications products and services offered in a complex and highly technical market. Although some TC managers are quite sophisticated, many others lack the rudimentary skills and knowledge necessary to confront current TC issues. In a proprietary study with which the authors are familiar, many of the TC managers interviewed were found to be without the TC knowledge, background and,

unfortunately, concern necessary to ensure alignment of TC capabilities with strategic intent.

Research has indicated that responsibility for TC related activities may be only one of several job duties required of the individual. For example, a facilities manager or maintenance manager may oversee TC activities. Further, TC and IS activities may be separated, reflecting the organization's separation of data processing and data communications from voice communications [20]. In such instances, the manager may feel overwhelmed by his or her lack of ability to fully assess TC needs in the face of the myriad of TC products and services available and an ever-growing number of vendors willing to supply different combinations of these products and services. Recent deregulation of the TC industry will further muddy the waters and cause more confusion as the result of even more choices concerning TC products and services being available to the TC manager.

While there are exhaustive sources for analysis and design for IS, these sources are generally intended for modernizing or upgrading computer-based systems. As such, they do not necessarily target networking or other TC technologies. There is a need for a parallel, systematic process for TC.

Although IS researchers have given the telecommunications field considerable attention in recent years, needs assessment has not yet been adequately addressed. For the purposes of this study, we define the term "needs assessment" as *an integrated set of procedures which provide the basis for an action plan, whereby organizational needs can be efficiently addressed in a cost-effective manner consistent with organizational goals and objectives*. This term should not be confused with requirements analysis as used in traditional analysis and design methodologies, which may be a component of a needs assessment. Requirements analysis focuses on the needs of the individual or group in accomplishing specific tasks. As such, the term encompasses a much narrower application than the concept of a needs assessment. IS researchers have presented many studies concerning requirements analysis. Unfortunately, the needs assessment process has received little, if any, attention within the IS arena.

This paper is intended as a first step in building a normative model for guiding managers who endeavor to align their organization's TC capabilities with the firm's business strategies. The first phase of this normative model is a needs assessment. The purpose of this paper is to identify the component elements and structure of a needs assessment process that can be used by TC managers.

## THEORETICAL BACKGROUND

Understanding needs is not a new subject to IS researchers, especially in the area of systems analysis and design. System developers need to have a clear understanding of the decision problem being supported by an information system [22, 32]. To this end, MIS researchers have modeled the Systems Development Life Cycle (SDLC). Although the components of the SDLC vary in level of detail from author to author (e.g., [22, 32]), the SDLC is traditionally described as consisting of five phases: 1) problem definition, 2) analysis of the current system, 3) design of the new system, 4) system development, and 5) implementation and maintenance [13]. Determination of user needs (requirements analysis) is a component part of problem definition [22].

**Needs assessment in telecommunications.** The IS literature makes little mention of the term "needs assessment." When used, the term describes a process focused on defining the needs of a user, or group of users, for accomplishing a specific task. As used in this study, a needs assessment is a much broader concept, focusing on a structured process to determine which capabilities will best support organizational goals. While the systems analysis and design area has identified a systematic process for modernizing or upgrading computer-based systems [13], the same cannot be said for the telecommunications area. Our review of the IS literature failed to identify any research targeting a structured needs assessment process for telecommunications systems, technologies, or services.

Interviews with a select group of telecommunications managers and vendors indicated that there is no generally accepted needs assessment process currently available to TC managers to assist them in identifying the telecommunications needs of their organizations. Not surprisingly, the TC managers we interviewed stated that they relied heavily on vendors in determining which services and technologies are best suited to their organizations. The vendors, in turn, stated that they did have a systematic process for determining telecommunication needs. However, the processes used by the vendors are proprietary and not generally available to TC managers.

**Needs assessment models used in other fields.** Other fields typically use needs assessment as a basis for action plans. Our review of the cross-field, business-related literature identified two articles that propose needs assessment models. The models are depicted in Figure 1. Each of the models is a phase model, where completion of one step leads to the next.

The first model presented in Figure 1 is a seven-step process for needs assessment in human resources (HR) departments. The author asserts that only after a needs assessment is completed can a HR department align with its customer's business objectives [29]. The second model is a nine-step process to be used by not-for-profit hospitals to determine the health care needs of their communities. In this environment, community health needs have a direct affect on perceptions of how well a hospital is meeting its responsibilities [31].

**Component elements of a needs assessment.** The literature review on needs assessment also allowed us to identify many specific items that researchers have considered as important to the needs assessment process. Our search produced a listing of 37 articles that made mention of the terms "needs assessment" or "organizational needs." Of the 37 articles identified, 19 were not applicable to this study because "needs assessment" not an integral part of the article. Therefore, 18 articles from a variety of industries or functional areas were used in this study.

These articles dealt with needs assessments to different extents. In 13 articles, the needs assessment process was the primary focus of the article, while in five needs assessment was mentioned as a peripheral, support, or secondary issue. Ten of the articles were applicable to business in general, while eight were directed toward such diverse fields as health care, real estate, education, manufacturing, high-tech industries, public safety management, and training and development.

Although most of the articles concerning needs assessment did not propose a formal model, the authors noted a number of specific points that should be given attention when conducting a needs assessment. We call these points "component elements" of the needs assessment process. They should not be confused with the major phases, or steps, of the process, as they are individual tasks or concerns that must be addressed during the performance of one of the larger, more encompassing phases.

Table 1 lists each of the articles on needs assessment identified in the literature review by the industry or functional area that the study targeted. Each of these articles identified one or more component elements that were considered important to a successful needs assessment. Table 2 categorizes these component elements by the ten industry or functional areas represented in the literature. The table indicates which articles discuss each of the component elements and the industry/functional category(s) in which the element was addressed.

**Summary.** The IS literature does not address needs assessment. However one purpose of the SDLC is to align information systems and strategy. Although the SDLC and the telecommunications needs assessment differ, some of the principles from the SDLC may be applied to aligning telecommunications needs and organizational strategy.

Although neither of the two needs assessment models identified in the literature addresses telecommunications needs, both address needs assessment from an organizational standpoint. As such, they offer insight into the basic needs assessment process and hold the potential for adaptation to organizational TC needs.

The literature also allowed us to identify many component elements that researchers believe should be included in a needs assessment process. The combination of the SDLC, the two needs assessment models, and the component elements identified from the articles represent the theoretical basis for formulating our TC needs assessment model.

## METHOD

Our study used a deductive approach to develop a needs assessment model for use by TC managers. The research included three phases: 1) identification of a theoretical background for a needs assessment process, 2) semi-structured interviews with TC managers, and 3) development and assessment of a model of the needs assessment process.

### Phase 1: Identification of the theoretical background

In the first phase of this study we identified the theoretical background for the needs assessment process. The purpose of this part of the research was to determine what is known concerning needs assessment so that the theory could be used as a basis for deductive reasoning in the subsequent phases of the project. We reviewed the IS literature on needs assessment, conducted preliminary interviews with TC professionals, performed a cross-field review of the literature on needs assessment, and analyzed the content of the literature identified in the reviews.

**Review of the IS literature.** We examined the IS literature for research concerning needs assessment for telecommunications to determine if past studies had identified either a model for TC needs assessments or the necessary and sufficient elements of a TC needs assessment. We performed a keyword search of the periodical indices ABI/INFORM and Business Source. The search was limited to the periodicals and books that focus on information technology. Articles and books were chosen for review if some form of the terms "telecommu-

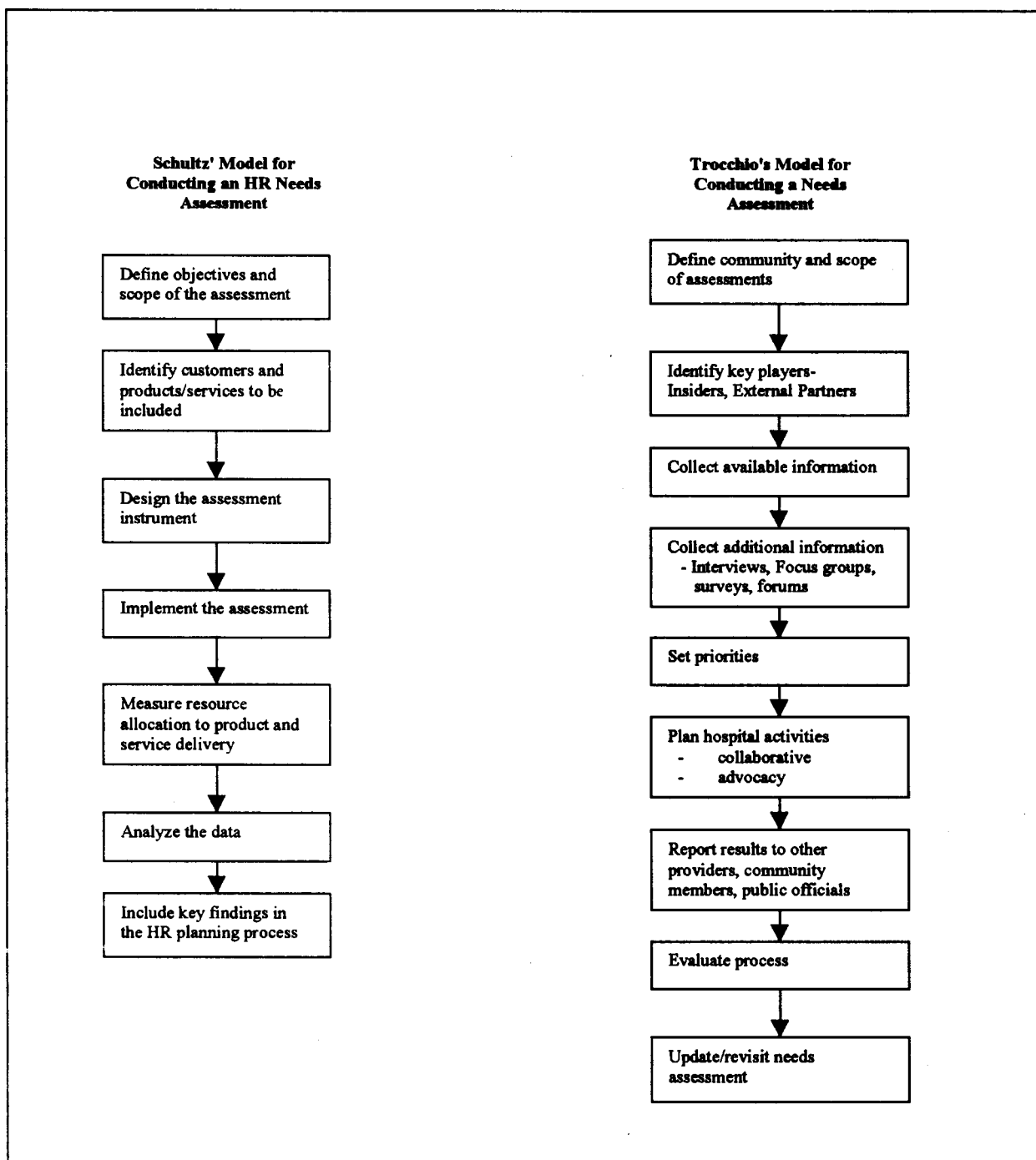


Figure 1: Needs Assessment Models Identified in the Literature

Industry/Functional Area	Publication Reference(s)
Government Agency	Hubble & Green, 1992; Gallelli, 1994.
Human Resource Management/Training	Schultz, 1995; McClelland, 1992; Rinholm, 1994; Kaufman, 1994.
Industry Association	Kavanaugh, 1994.
High Tech Industry	Bacon, Beckman, Mowery, & Wilson, 1994; Durkin, 1994.
Health Care	Roberts & Shortell, 1994; Trocchio, 1994.
Education/Training	<u>Association Management</u> , 1994.
Real Estate/Facility Management	Brown, Lapides, & Rondeau, 1994.
Corporate Training	Goldstein, 1993; Fitz-Enz, 1994; Cline & Seibert, 1993.
Industrial Sales	Monoky, 1994.
Professional Association	Macenski, 1994

**Table 1 - Publications Representing the 10 Industry/Functional Areas**

COMPONENT ELEMENTS	Gov't Agency	HRM. Training	Industry Assoc.	Hi-tech Industry	Health Care	Education & Training	Real Estate/Facility Manag't	Corporate Training	Industrial Sales	Profess' Assoc.
Interviews	[14]	[21, 25, 29]	[18]	[1, 8]	[31]	[24]		[5, 9]		
Group discussion	[14]	[25, 29]		[1, 8]	[31]	[24]				
Formal Report	[14]	[17, 21]		[8]	[31]			[5, 11]		
Outside Consultants			[18]	[1, 8]	[31]					
Hard Data			[18]							
Expectations								[11]		
Prior Research				[1]						
ID Data Sources				[1]					[23]	
Data Compilation	[14]			[1]					[23]	
Use of Statistics		[29]		[1]						
Needs vs. Strategic Plan		[17]					[3]			
Internal vs. External Sources		[29]		[1]	[31]					
Assessments Goals		[25]							[23]	
Management Commitment		[21]		[1]			[3]	[11]		
Methodology		[17]				[24]				
Assessment Control & Administ'n		[21]								
Analysis of Results		[17, 29]			[31]		[3]			
Review of Job Functions			[18]			[24]				
Interview Providers/ Vendors			[18]			[24]				
Test System Before Use			[18]					[11]		
Technical Audit			[18]							
Available Funding							[3]			
Continuous Assessment Cycle	[10]			[8]	[31]	[24]				[19]
Technological Risks/ Opportunities				[1]			[3]			
User Needs/ Requirements		[21, 25]				[24]	[3]			
Competitor Information						[24]				
Priorities Determination	[10]	[17, 29]		[1]	[31]			[5, 11]		
Nature of Problem									[23]	[19]
Collaboration/ Partnership					[31]					
Current Results vs. Expectations			[18]							
Positive ROI		[17]					[3]			
Use of Questionnaires	[14]	[21, 25]		[1, 8]	[31]	[24]		[9]		[19]

Table 2: Component Elements Identified in the Literature Review

nications needs," "needs assessment," or "organizational needs" were in the title, keyword list, or abstract. The rationale for this search standard was based on the fact that, because the concept of needs assessment is ill-defined, authors that label their publications with the term(s) or address TC needs, needs assessment, or organizational needs to the extent that the term(s) is included as a keyword or in the abstract are contributing to the explanation of the needs assessment concept. The bibliographies of the literature selected were reviewed for additional items not previously discovered. Therefore, this body of literature set forth what is formally known about needs assessment in the IS literature.

**Preliminary interviews.** Because we found no articles or books in the IS literature that explicitly addressed TC needs assessment, we interviewed a focus group consisting of three TC managers and a TC vendor to ask how they assessed TC needs. This preliminary interview of working professionals seemed a logical next step, as we had failed to identify any IS literature that would help to explain the process. The group met with us at one of our offices. The meeting consisted of an informal discussion on TC needs assessment, focusing primarily on how the managers determined which TC technologies and services would best serve their organizations.

**Cross-field literature review.** The absence of any formal process followed by the TC managers and their reliance on vendors for determining needs led us to conduct a second literature review. As with the review of the IS literature, we performed a keyword search of the periodical indices ABI/INFORM and Business Source. This search was not restricted to IT-related publications, however. Again, articles and books were chosen for review if some form of the terms "telecommunications needs," "needs assessment," or "organizational needs" were in the title, keyword list, or abstract.

A content analysis of the articles was performed to identify 1) the steps involved in needs assessment models promoted by researchers in the various fields and 2) the important component elements associated with needs assessment. To ensure that no pertinent elements addressed in the literature were inadvertently omitted, the authors reviewed the articles independently. Their separate inputs were then synthesized to form a consolidated listing of the important factors of a needs assessment process. Disagreement on classification or pertinence was resolved through discussion to arrive at a consensus.

### **Phase 2: Interviews with TC Managers**

In the second phase of this study, we asked managers with TC responsibilities in different organizations questions relating to how they went about determining what products and services to use. We conducted semi-structured, personal interviews of managers with TC responsibilities in different organizations through a sample of convenience. The purpose of this phase was to determine what working professionals within the telecommunications arena indicated to be important parts of a needs assessment. The title, responsibilities, and a description of the employer organization for each of the interview participants are shown in Table 3.

Each interview was conducted at the manager's office. Table 4 lists the open-ended questions each manager was asked concerning his or her telecommunications responsibilities and opinions concerning needs assessment.

### **Phase 3: Model Development and Assessment**

The third phase of the study built upon the results in the first two phases to develop a model for TC needs assessment and to assess the value of the developed model. This phase included a synthesis of the results of the cross-field review of the needs assessment literature and the semi-structured interviews of TC managers and assessment of the model by the TC managers and authors.

**Model Development.** The information obtained from the interviews with the TC managers was used in the third phase of the study to match the key issues identified by practitioners with the generic listing of the steps and common elements of a needs assessment identified from the cross-field literature review. The purpose of this phase was to develop an initial model, based in established theory, that could be evaluated for its usefulness by telecommunications managers.

Transcripts of the interviews with each of the TC managers were created. A content analysis was performed on the transcripts to determine if the managers mentioned any of the steps or component items identified in the literature review when they answered the question, "What are some of the things you think a needs assessment should include?" Any step or item that had been identified in the literature review *or* by a manager was considered a candidate for inclusion in the model.

The phases of a TC needs assessment model were identified through a synthesis of the results from the literature review and the interviews of the managers with TC responsibilities. Both the seven-step HR model [29]

and the nine-step model from the hospital industry [31] were evaluated in the context of the statements from the TC managers about what they believed a TC needs assessment should include. In addition, the phases

TITLE	RESPONSIBILITIES	EMPLOYER ORGANIZATION
Executive Vice-President for Administrative Support Services	Management of 85-person department responsible for supplying administrative (i.e., MIS, accounting, scheduling, personnel, clerical, etc.) services to the engineering production function	High tech contractor, aerospace division, 900+ employees housed in 7 buildings. Corporate office located in another U.S. region.
Dean of Financial Affairs	Management of 37-person staff covering business office, facilities/maintenance, MIS	2-year Junior College of approx. 5500 students and 100 faculty
Office Manager	Management of 11-person staff responsible for all business functions and clerical support	Regional law firm operating in 3 cities. Home office: 7 lawyers, 6 support staff. Branch #1: 4 lawyers, 3 support. Branch #2: 3 lawyers, 2 support
Dean of Academic Affairs	Management of 83 faculty and 12 faculty support staff	Upper-level public Senior College with approx. 3300+ students

Table 3 - Characteristics of Interviewees

<p>What are your TC responsibilities?</p> <ul style="list-style-type: none"> <li>• Do you use some sort of structured format to assist you in deciding when and what TC services/products to implement? If not, what procedure do you now use?</li> <li>• Do you see a use for a structured needs assessment process?</li> <li>• What are some of the things you think a needs assessment should include?</li> </ul>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 4 - Open-ended Interview Questions



associated with the SDLC were considered in the determination of the appropriate phases of the TC needs assessment.

To provide a more complete model of the process of needs assessment in telecommunications, we included the component elements from Table 2 that were either 1) identified in at least three articles from the results of the literature review, or 2) were mentioned by two or more TC manager interviewees. Based upon the authors' best judgements, the elements were then assigned to what we considered the appropriate step within the TC needs assessment process. Each author, working independently, assigned the elements that we had identified as appropriate to what he considered the proper phase of the model. Once this process had been completed, we resolved any differences by discussion to reach a consensus on an initial TC needs assessment model.

**Assessment and refinement of the initial model.** Once the initial model had been developed, the next step in the project was to assess the model. We presented our initial model to twelve managers with TC responsibilities and asked them for their opinions concerning the usefulness of the model. In addition to the four managers with TC responsibilities interviewed in the previous phase of the project, we contacted eight TC managers whose responsibilities were almost exclusively in the TC area. The addition of the eight TC managers allowed for a group that we believe is representative of the varying levels of expertise possessed by managers in the TC field.

Each of the twelve managers was supplied with a draft copy of our initial model and a list of all component elements identified from the literature. The managers were asked to evaluate the model for: 1) adequacy and appropriateness of the phases and component elements of the model; 2) proper assignment of the component elements to the respective phases of the model; and 3) the model's overall usefulness to TC managers. Discussion of the initial model's characteristics took place in each of the respective managers' offices, with one or both authors in attendance.

Based upon the twelve managers' evaluation of the initial model, the titles and order of some of the phases were changed and some component elements were added, eliminated, or moved. The finalized model was again presented to the twelve TC managers as a method to validate the TC needs assessment model. To complete the study, the authors drew conclusions concerning the model and implications and limitations of the study were identified.

## MODEL DEVELOPMENT

The IS literature review and preliminary interviews were conducted to determine if a needs assessment process was currently available for use by TC managers. Although the SDLC methodology and its emphasis on understanding user requirements is well represented in the IS literature, we found no such method for determining telecommunications needs.

The preliminary interviews with TC managers and a TC vendor representative indicated that they frequently reacted to a request for additional services or capabilities from organization members by relying on a major vendor to supply a (hopefully) cost-effective solution. The managers said they rarely attempted to anticipate future needs, opting instead to satisfy current requests only. The results of these initial inquiries, therefore, gave us no indication that a structured or systematic procedure for needs assessment was available to TC managers.

The theoretical background that we identified as a basis for a model of TC needs assessment comes from the cross-field, business-related literature. The literature produced only two models, one from the human resources function [29] and one from the health care industry [31], that appear to lend insight into the general needs assessment process. The literature review also identified many component elements that researchers have determined to be important to the needs assessment process. Table 5 summarizes the results obtained from an analysis of each of the 18 articles that represented the cross-field literature on needs assessment. The table summarizes the number of articles (from the total of 18) that discuss each of the frequently cited component elements and the number of industry/function categories by which each element was represented in the literature.

The semi-structured interviews with four individuals with TC responsibilities were designed to assist us in placing the general results of the literature review in the specific context of the telecommunications field. Analysis of the transcripts of the interviews allowed us to compare the statements made by the TC managers with the steps included in the general models identified in the literature and the steps involved in the SDLC.

**Phases of a TC needs assessment.** To determine the phases associated with a telecommunications needs assessment, we synthesized the results obtained from our literature review and the interviews of the managers with TC responsibilities. The result of this synthesis is the seven phase structure depicted in Figure 2.

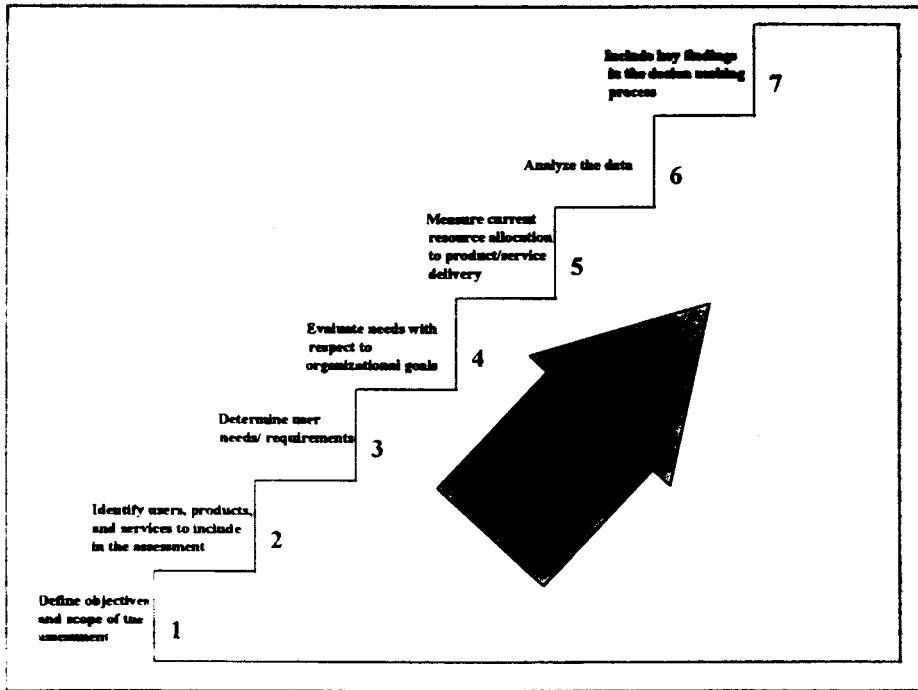


Figure 2 - The Seven Phases to a TC Needs Assessment

Phase 1 begins the process by defining the objectives and scope of the assessment. This phase establishes the measurable outcomes expected of the assessment and the parameters for determining what will be and will not be included in the needs assessment process.

The second phase identifies the users, products, and services to include in the assessment. This phase identifies the constituencies within the organization that will be affected by the needs assessment process. Users and the products and services delivered by the organization must be explicitly considered by the TC managers when telecommunications technologies, products, or services are acquired.

The third phase determines user needs/requirements. While this step has many similarities with its counterpart in the SDLC, it is specifically directed toward determining required telecommunications support rather than computerized applications or products.

Once needs have been determined, they must be evaluated with respect to organizational goals, the fourth step in the process. A key purpose of a needs assessment is to ensure that resource allocation is consistent with the mission, vision, values, and goals of the organization. As such, recognition of how the various independent user needs/requirements can be successfully integrated with an organizational focus is mandatory. Only then can an organization address such problems as duplication of effort and incompatibility of TC products and services with specialized functional or departmental systems.

Component Elements:	# of Citations by Category	# of Article Citations
Interviews	7	11
Questionnaires	7	9
Formal report	5	7
Group Discussion	5	7
Priorities Determination	5	7
Continuous Assessment Cycle	5	7
Management Commitment	4	4
Analysis of Results	3	4
Identify User Needs/Requirements	3	4
Use of Outside Consultants	3	4
Data Compilation	3	3
International vs. External Sources	3	3

Table 5 - Needs Assessment Component Element Citations by Article and Industry/Function

The fifth phase of the assessment measures the current resource allocation in comparison with the products/services currently delivered by the organization's telecommunications area. This phase can help to determine TC products/services offered, but not utilized and TC products/services needed, but not offered.

The sixth phase of a TC needs assessment is to perform analyzes the data collected in the preceding phases. This step develops information from the data gathered in the previous phases to be used as the basis for decision making and findings of the assessment process are developed and explored.

The seventh and final phase includes the key findings from the previous phase in the decision making process. A needs assessment should be a basis for an action plan whereby organizational needs can be efficiently addressed in a cost-effective manner consistent with organizational goals and objectives.

**Component Elements of the TC Needs Assessment.** Although there are few models for needs assessment in the research literature, many authors have pointed out important tasks or concerns that must be addressed when conducting a needs assessment. We have assigned many of these component elements to what we consider the appropriate phase of the model identified in the preceding section.

*Interviews with users/customers* was listed most frequently as an important element in a needs assessment (11 article citations from seven of the 10 categories). This finding is consistent with our interviews of managers with TC responsibilities. The second-most frequently identified element was *use of questionnaires*, included in nine articles and seven of the 10 categories. Use of questionnaires referred to surveying employees across organizational levels and functions. Although this element was not mentioned by our interviewees, one manager did mention that she felt some method of capturing the full spectrum of employee needs would be especially beneficial in her particular situation.

The next most frequently cited elements were *issuance of a formal report*, *group discussions*, *determination of priorities*, and *continuous assessment cycle*, each with five to seven article citations from five categories. Issuance of a formal report was considered as a necessary and concluding element to inform management of findings and recommendations. Group discussions were identified as an important way to involve individuals with differing backgrounds in the needs assessment process, thereby ensuring all points of view are considered. Group discussion was also mentioned as an effective way of generating alternatives when new products or services are considered. Determination of priorities refers to rank-ordering needs so that resources may be allocated in a manner consistent with budgetary or other organizational constraints. Several interviewees stated that cost/benefit analysis was performed on individual project proposals; however, comparisons between project proposals were not usually conducted. Rather, each individual project was evaluated on its own merits, regardless of its possible effect on other projects. The need for a continuous assessment cycle is driven by two major considerations: 1) the rate of introduction of new TC technologies which must be considered for integration into the existing organizational TC infrastructure and 2) the need to ensure that constantly

changing user requirements and business strategies are continually and consistently evaluated.

*Attaining management commitment* was discussed in four articles from four different categories. This component element of a needs assessment includes two aspects. First, management must be convinced that a needs assessment is necessary. Second, management must agree that the findings and recommendations of the completed needs assessment will receive appropriate consideration in the decision-making process. Because none of our interviewees currently use a needs assessment methodology, they did not discuss management commitment in their answers to our open-ended questions.

*Analysis of results, determination of user/customer needs and requirements, use of outside consultants, compilation of data, and use of internal/external sources* each had three or four article citations from three categories. Analysis of results deals with developing an understanding of and the potential effects of the findings of the needs assessment. Determination of user/customer needs and requirements can be accomplished through *questionnaires*, *interviews* or *group meetings*, three items already discussed. This determination is one of the primary foci of the needs assessment process; however, our interviewees cautioned us that user needs and requirements can often be a never-ending "wish list." The TC manager must ensure user needs and requirements are aligned with organizational goals through a determination of priorities.

*Use of outside consultants* was considered important because the organization sometimes lacks expertise in a technical area, skills necessary to conduct a needs assessment, or the necessary objectivity to make difficult choices. Our interviews confirmed that many TC managers prefer to rely on trusted vendors to supply solutions to user needs. Each TC manager interviewed stated that often their first action in response to a request for a new product or service was to contact a vendor for assistance in determining how best to deal with the request.

The literature considered *compilation of data* an important part of any needs assessment process. The premise here is that more information makes for a better decision. This element includes organizing and synthesizing data into pertinent information so that informed judgements can be made. The interviewees made no mention of how or when they gathered and compiled data.

Recognition of *internal versus external sources* was recognized as important in industries or functions in which collaborations or partnerships are important. This element has significant ramifications with respect to

telecommunications infrastructures required to support organizations whose facilities are distributed or are reliant on connection to outside sources.

Cost/benefit analysis, *positive return on investment*, user satisfaction surveys, and analysis of strategic "fit" with the organization's mission, vision, values, and goals are some of the more prominent methods of analysis mentioned in various articles. Procedures currently used by the TC managers we interviewed seldom included these types of analyses. Because the managers usually selected the first acceptable alternative presented to them, they seemed to assume that the alternative would assure fulfillment of needs and strategic "fit." One TC manager, however, indicated that he had experienced a situation where two implementations for separate departments conflicted with each other. The implementations were incompatible and not interoperable, causing sub-optimization from a total organizational perspective. He stated that each implementation had seemed like a fine idea when considered separately.

The literature review also identified other items considered important to the needs assessment process. However, these factors were listed in only one or two instances, as compared with the above factors that were identified as important across three or more categories of industry/function. These factors included *uses of hard data, identify expectations, identify data sources, compare needs vs. strategic plan, assessment goals, assessment control and administration, review of job functions, technical audit, available funding, current results vs. expectations, prior research, use of statistics, methodology, and competitor information.*

**Initial TC needs assessment model.** The two models that we identified in the literature had virtually no details about the elements that should be included in each of the model phases. A complete model for TC needs assessment should include the tasks and concerns associated with each phase. Therefore, we developed a draft TC needs assessment model (Figure 3), with phases and component elements, from a synthesis of the literature and our interviews of the TC managers.

We considered one of the component elements, *user needs/requirements*, to be virtually the same as phase three. Therefore, this component elements does not appear under a phase. Ten of the component elements included in the initial model appeared in at least three articles and are included in the model. Additionally, 11 other component elements are included, based upon the comments of the interviewees. For example, the component element *review of job functions* was only discussed in two of the articles, but three TC manager interviewees stated that they felt gaining an understanding

of user job descriptions and duties was important in determining TC needs.

The TC Needs Assessment Model. Our initial model was based on the literature and interviews with four managers with TC responsibilities. When the model was presented in draft form to a larger group of managers, we received many comments intended to improve the process, especially from the eight managers that had primary responsibility for, and substantial expertise in, telecommunications. The recommendations were of three types: 1) recommendations concerning the title(s) or order of the phases within the model; 2) recommendations concerning the phase with which a component element should be associated; and 3) additional component elements to be included in the model. The recommendations were incorporated into the final model, as presented in Figure 4.

The TC managers recommended that the phase titled "Measure current resource allocation to product/service delivery" be renamed "Evaluate capability of current resource allocation to satisfy prioritized TC product/service needs." The managers also suggested that this phase should come after the phase "Analyze the data." The rationale for this change is that, until the data analysis is complete, information necessary for this evaluation is not available. The TC managers also recommended changing the title of Phase 7 from "Include key findings in the decision making process" to "Report key findings and recommendations to decision makers." The TC managers believe this title to be more descriptive of the nature of the phase, as they are often unable to control what is actually included in the decision making process.

The managers also suggested that some of the component elements in the initial model could be combined or would be more appropriately placed in another phase of the model. As a result of the managers' input, *identify data sources* and *internal and external sources* were combined as *identify internal and external data sources* under Phase 2. *Positive return on investment* was moved from the data analysis phase to "Evaluate capability of current resource allocation to satisfy prioritized TC product/service needs." The managers believe that return on investment is an important criterion when evaluating how resources are allocated. The managers also reviewed the entire listing of component elements that we identified from the literature. Four additional elements that had not been included in the initial model were deemed necessary for inclusion in the final model. In the first phase, the component elements *nature of the problem* and *methodology* were included in the final model. The managers expressed the view that

**PERFORMING A NEEDS ASSESSMENT INCLUDES THE FOLLOWING STEPS:**

- Define objectives and scope of the assessment

*Attain management commitment*  
*Assessment goals*  
*Identify expectations*

- Identify users, products, and services to include in the assessment

*Identify data sources*  
*Use of outside consultants*  
*Internal vs. External Sources*

- Determine user needs/requirements

*Interviews with users/customers*  
*Review of job functions*  
*Use of questionnaires*  
*Group Discussions*

- Evaluate needs with respect to organizational goals

*Compare needs vs. strategic plan*  
*Available funding*  
*Determination of priorities*

- Measure current resource allocation to product/service delivery

*Assessment control and administration*  
*Current results vs. expectations*

- Analyze the data

*Use of hard data*  
*Compilation of data*  
*Positive return on investment*  
*Technical audit*

- Include key findings in the decision-making process

*Issuance of a formal report*  
*Continuous assessment cycle*

**Figure 3 - Draft Model Presented to TC Managers**

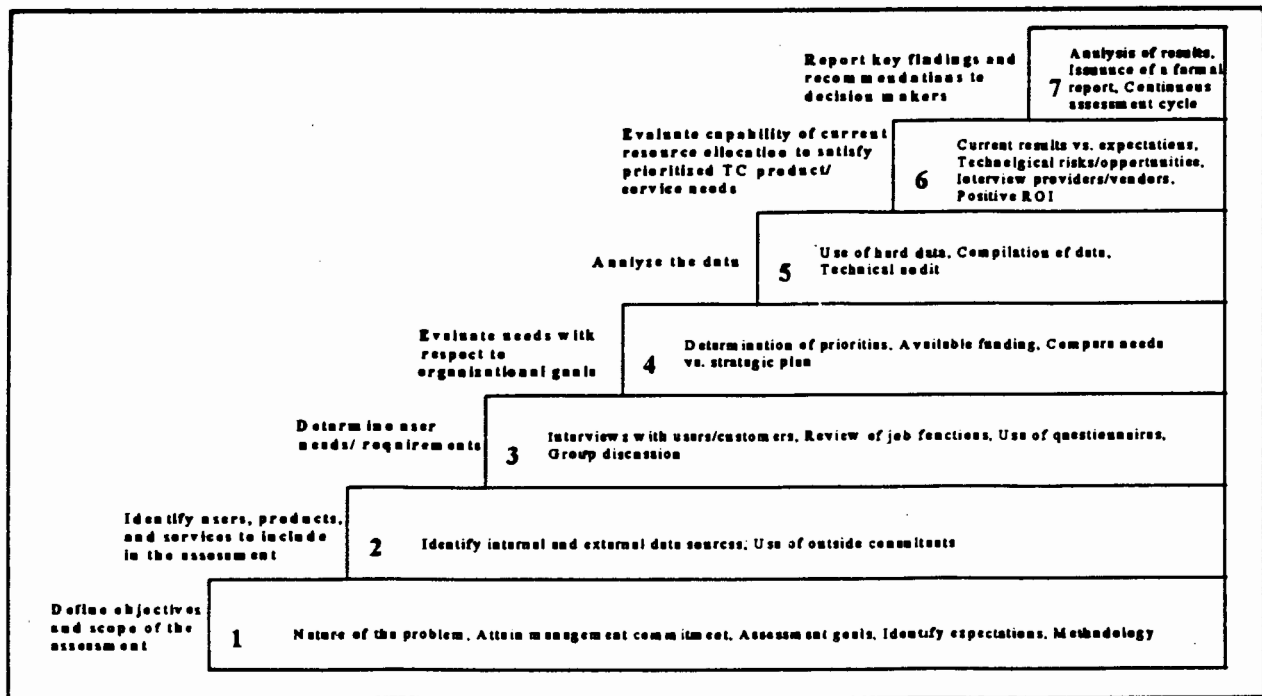


Figure 4 - A Needs Assessment Model for Telecommunications Managers

final model. In the first phase, the component elements *nature of the problem* and *methodology* were included in the final model. The managers expressed the view that problem identification and definition is an important starting point in telecommunications capabilities management, just as it is in systems analysis and design. The managers also believe that it is important to have a good methodology to follow in assessing TC needs, although they quickly pointed out that they did not know of a methodology that was currently available.

The managers also recommended that *interview providers/vendors* be included as a component element of a TC needs assessment. The final model includes this component element in the second phase - "Identify users, products, and services to include in the assessment," as a tool to assist the managers in their identification of these considerations. In addition, the managers suggested that the component element *evaluate technological risks/opportunities* be included in the final model as part of the "evaluate capability..." phase.

**The managers' assessment of the final model.** A final critique of the refined model (Figure 4) by the managers allowed for us to gauge the model's general acceptance among a group of managers with varying levels of expertise in TC. Each of the twelve managers that participated in this study stated that they believed the

model would help them in assessing telecommunications needs for their respective organizations. All of the managers indicated that they would use the model as a guide in the future as their organizations attempted to determine what TC products and services to acquire.

The managers stated that they believed that the phases and component elements of the TC needs assessment model effectively described a complete set of considerations and tasks that must be accomplished to align the organization's telecommunications structure and its strategy. There was initially some disagreement among the various managers regarding the importance of sequentially adhering to the order of the component elements within each phase. This concern was resolved through general agreement that individual circumstances within a specific organization might require different sequencing of the component elements within a particular phase. There are also situations where two or more component elements might be performed concurrently. However, all of the managers agreed that it is essential to complete the phases sequentially, at least provisionally. The managers also agreed that it could be necessary to revisit a phase as additional information is obtained in a subsequent phase, recognizing that the phase model allows for feedback and iteration.

## CONCLUSIONS

This research project culminated in the development of a needs assessment model designed specifically to assist managers with telecommunications responsibilities in aligning an organization's TC needs and its strategy. It is the first framework of its kind in the telecommunications arena.

Our research indicates that the acquisition of TC products and services has traditionally been a somewhat haphazard process, where TC managers often rely on TC vendors, with different vested interests, to supply solutions to the managers' problems. This study also indicates TC managers pursue a generally reactive strategy to implementing new products and services. The needs assessment model can be of assistance to TC managers as they endeavor to become less dependent on TC vendors/providers and more proactive in their actions.

Our model is intended as a first step toward a normative model for guiding managers who endeavor to align their organization's TC capabilities with the firm's business strategies. We believe the model can add structure to the process of providing the basis for an action plan, whereby organizational needs can be efficiently addressed in a cost-effective manner consistent with organizational goals and objectives

## LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

This paper has proposed a framework for assessing organizational TC needs. However, the research presented here is not without limitations. First, the work relies heavily upon a relatively small sample of managers with TC responsibilities. As such, the sample is not sufficiently large enough to validate the model. Also, the model has not been practically applied. In addition, the model presented here has been specifically developed for TC needs assessment and may not be appropriate for other types of needs assessment.

The model has not been validated in either field or laboratory contexts using problems actually faced by subjects or assigned by experimenters. Such research could provide more comprehensive results that may improve the reliability of the model. From a telecommunications perspective, many of the important elements listed in each step may need to be further defined and expanded. A study linking strategic direction to product and service alternatives would also be helpful.

## REFERENCES

- [1] Bacon, G., Beckman, S., Mowery, D., and Wilson, E. "Managing product definition in high-technology industries: A pilot study," *California Management Review*, Volume 36, Number 3, 1994, pp. 32-56.
- [2] Battaglia, G. "Strategic information planning: A corporate necessity," *Journal of Systems Management*, Volume 42, Number 2, 1991, pp. 23-26.
- [3] Brown, R., Lapides, P., and Rondeau, E. "Corporate policy is part of RE/FM planning," *Facilities Design & Management*, Volume 13, Number 7, 1994, pp. 50-53.
- [4] Brynjolfsson, E. "The productivity paradox of information technology: Review and assessment," *Communications of the ACM*, Volume 35, Number 12, 1993, pp. 67-77.
- [5] Cline, E. and Seibert, P. "Help for first-time needs assessors," *Training & Development*, Volume 47, Number 5, 1993, pp. 99-101.
- [6] Dearing, B. "The strategic benefits of EDI," *The Journal of Business Strategy*, Volume 11, Number 1, 1990, pp. 4-6.
- [7] Dowling, M., Boulton, W., and Elliott, S. "Strategies for change in the service sector: The global telecommunications industry," *California Management Review*, Volume 36, Number 3, 1994, pp. 57-88.
- [8] Durkin, N. "Total research quality management process at Vista Chemical Company," *Industrial Engineering*, Volume 26, Number 1, 1994, pp. 30-31.
- [9] Fitz-Enz, J. "Yes ... you can weigh training's value," *Training*, Volume 31, Number 7, 1994, pp. 54-58.
- [10] Gallelli, J. "Changes in public safety technology management," *Communications*, Volume 31, Number 4, 1994, p. 80.
- [11] Goldstein, I. *Training in organizations: Needs assessment, development, and evaluation*, Brooks/Cole Publishing Company, Pacific Grove, CA, 1993.
- [12] Grover, V. "An empirically derived model for the adoption of customer-based interorganizational systems," *Decision Sciences*, Volume 24, Number 3, 1993, pp. 603-640.



- [13] Henson, K. and Hughes, C. "A two-dimensional approach to systems development," *Journal of Information Systems Management*, Volume 8, Number 1, 1991, pp. 35-43.
- [14] Hubble, L. and Green, R. "State training needs assessment," *The Public Manager*, Volume 21, Number 2, 1992, pp. 33-36.
- [15] Jarvenpaa, S. and Ives, B. "Information technology and corporate strategy: A view from the top," *Information Systems Research*, Volume 1, Number 4, 1990, pp. 351-376.
- [16] Kaufman, F. "Data systems that cross company boundaries," *Harvard Business Review*, Volume 44, Number 1, 1966, pp. 141-155.
- [17] Kaufman, R. "Auditing your needs assessment," *Training & Development*, Volume 48, Number 2, 1994, pp. 22-23.
- [18] Kavanaugh, E. "Get computer literate," *Association Management*, Volume 46, Number 4, 1994, pp. 42-45+.
- [19] Macenski, A. "A vision for the future," *Professional Safety*, Volume 39, Number 5, 1994, pp. 7, 56.
- [20] McCreary, J. "Alternate local telecommunications services: an experimental study of telecommunications managers' decision making processes," *Unpublished Doctoral Dissertation*. Auburn University, 1996.
- [21] McClelland, S. "A systems approach to needs assessment," *Training & Development*, Volume 46, Number 8, 1992, pp. 51-53.
- [22] McLeod, R., Jr. *Management information systems: A study of computer-based information systems*, (6<sup>th</sup> ed.), Prentice-Hall, Englewood Cliffs, NJ, 1995.
- [23] Monoky, J. "Want to satisfy your customers' needs?" *Industrial Distribution*, Volume 83, Number 6, 1994, p. 79.
- [24] "More than 75 ideas to strengthen your educational programs," *Association Management*, Volume 46, Number 11, 1994, pp. 60-64.
- [25] Rinholm, B. "Training for new-product staff should be 'customer-driven'," *Marketing News*, Volume 28, Number 9, 1994, p. E11.
- [26] Roberts, C. and Shortell, S. "Are today's hospital CEOs prepared to lead networks?" *Hospitals & Health Networks*, Volume 68, Number 15, 1994, p. 12.
- [27] Rossetti, D. and DeZoort, F. "Organizational adaptation to technology innovation," *SAM Advanced Management Journal*, Volume 54, Number 4, 1989, pp. 29-33.
- [28] Sankar, C., Apte, U., and Palvia, P. "Global information architectures: Alternatives and tradeoffs," *International Journal of Information Management*, Volume 13, Number 2, 1993, pp. 84-93.
- [29] Schultz, J. "Align HR to serve the customer," *Personnel Journal*, Volume 74, Number 1, 1995, pp. 61-64.
- [30] Sookdeo, R. "How to bolster the bottom line," *Fortune*, Volume 128, Number 7, 1993, pp. 16-18+.
- [31] Trocchio, J. "The hows and whys of conducting a community needs assessment," *Trustee*, Volume 47, Number 3, 1994, pp. 6-7+.
- [32] Turban, E., McLean, E., and Wetherbe, J. *Information technology for management: improving quality and productivity*, John Wiley and Sons, New York, 1996.
- [33] Venkatraman, N. "Electronic integration and strategic advantage: A quasi-experimental study in the insurance industry," *Information Systems Research*, Volume 1, Number 4, 1990, pp. 377-393.

#### ABOUT THE AUTHORS

*Jeffrey S. Harper* is Assistant Professor of MIS and Chair of the Accounting, Economics, Finance, Legal Studies, and Information Systems Division of the School of Business at Athens State College, Athens, Alabama. He holds an M.S. in Management of Technology from the University of Alabama in Huntsville and is ABD in the Management Information Systems program at Auburn University. His dissertation investigates the problem definition concept in technology transfer. His current research interests include the use of information technology in technology transfer, innovation and diffusion of information technology, the management of technology, and telecommunications management. Articles describing his research have appeared in the *Journal of Computer Information Systems*, the *Journal of the International Academy for Case Studies*, and others.

*Robert G. Little, Jr.* is an Instructor in the Department of Information Systems and Decision Science at Auburn University at Montgomery. He holds an M.B.A. from Auburn University and is ABD in the Management Information Systems program at Auburn University. His dissertation examines the factors affecting the implementation of data warehousing. He has authored many conference proceedings reflecting his research interests in data communications, data warehousing, database management, and systems analysis and design.