Identifying key knowledge area in the professional services industry: a case study

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Abstract The purpose of this exploratory case study is to determine how an enterprise can identify and measure a key resource capability (critical knowledge area) to enhance competitive advantage, in the context of the emerging field of knowledge management. On the basis of the literature on resource capabilities and strategic management, the term critical knowledge area has been formulated as a label for a key resource capability.

Keywords Knowledge management, Competitive advantage, Resource management

Introduction

The relevance and importance of knowledge is becoming increasingly critical in business as we transition from an industrial era into an information and knowledge era.

With the arrival of the knowledge and information age as well as the service economy, the importance of effective knowledge and management has been emphasized by several scholars and industry analysts (Quinn, 1992; Toffler, 1990; Nonaka, 1991; Glazer, 1991; Leonard-Barton, 1992; Bohn, 1994; Klein and Prusak, 1994; Winslow and Bramer, 1994; Davis and Botkin, 1994; Peters, 1992). Drucker (1993, 1994) argues that the world is witnessing a great transformation, which he calls the "post-capitalist" society, in which the basic economic resources will no longer be the traditional production input factors, but that the primary resource for both organizations and the economy will be knowledge.

Organizational knowledge management (KM) as a source of competitive advantage is now widely recognized (Nonaka, 1991; Bohn, 1994; Davis and Botkin, 1994). KM holds key implications for virtually all industries. Research indicates that knowledge and knowledge work has infiltrated deep into the value chain of most businesses (Quinn, 1992). The reasons (such as product differentiation, creating "best in class" capabilities, setting high entry barriers, etc.) for this infiltration provide important insights into the area of organizational knowledge and its impact on core business processes and functions. According to Quinn (1992) the majority of all public and private organizations are rapidly shifting to become repositories and coordinators of knowledge-based activities.

As we transition from an industrial/manufacturing economy to a more service-driven economy, we see the emergence of knowledge-intensive service organizations emerging alongside the more traditional capital-intensive and labor-intensive organizations (Bonora and Revang, 1993). Examples of knowledge-intensive service organizations include consulting, software engineering, law firms, and health care.

Actually, the challenge posed to contemporary businesses, particularly knowledge intensive firms, is to remain competitive in a highly volatile and competitive knowledge environment where markets quickly shift, technologies rapidly proliferate, competitors multiply, and products and services become obsolete almost overnight. Increasing customer needs and demands for immediate high-value at low-cost mandates the harnessing of knowledge coupled with the flexibility to meet changing needs. Achieving this goal in the information age requires the implementation of strategies different from those that were effective in the industrial age. For traditional organizations, it is no longer adequate to only achieve production and manufacturing efficiency. Knowledge-intensive firms, as well as traditional organizations, now increasingly compete because of knowledge and information. As a result, the issue of ownership and control of knowledge as a source of power in business has also become increasingly important. Both industry and academia are looking for approaches and methods to capture, organize and leverage knowledge for increased competitiveness.

A set of publications (Stewart, 1994; Sadler, 1998; Sveiby and Risling, 1987; Sveiby, 1990; Starbuck, 1990) indicate that several organizations, particularly knowledge-intensive firms, are learning how to capture, manage, store and leverage knowledge and are making significant investments in KM. In this way, knowledge-intensive firms are increasingly implementing KM, which is not surprising, since the primary business base of this type of company, such as consulting and law firms, is the application of knowledge. Several key reasons reflect effective KM in these firms. Some authors include demonstrating accrued knowledge and experience in their area of service to customers, thereby retaining current customers and gaining new business by quickly delivering high value solutions at low cost (faster, better, cheaper than their competitors), leveraging knowledge and intellectual capital in a more cost and time efficient manner, developing employee competencies by sharing leading practices in their service areas, and capturing and preserving knowledge that may be lost as a result of individuals leaving the firm.
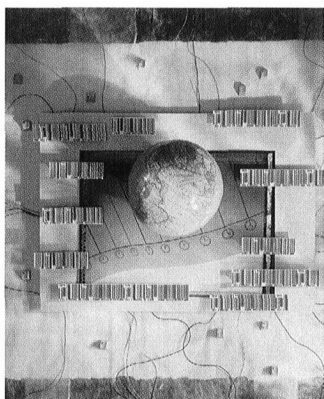
A review of literature in the area of knowledge, intellectual capital and information management reveals that while several scholars have highlighted the importance of knowledge and information management, few have attempted to illustrate how this management should occur. Research has primarily focused on theoretical models and frameworks and limited empirical work. Bohn (1994) notes this problem as he points out that while the vital impact of organizational knowledge on performance has now been widely recognized, the study of how to manage such knowledge is still in its infancy. In addition, several scholars have voiced the need for further empirical research. Nonaka (1991) argues ''despite the talk about 'brain power' and 'intellectual capital', few managers grasp the true nature of the knowledge-creating company – let alone know of how to manage it'' (Nonaka, 1991). Quinn et al. (1996) posit that few managers have systematic answers to even basic questions on managing professional intellect.

This study tries to develop, through a case study, an organizing framework linking KM and sustainable competitive advantage inside a real firm, Andalusian Technology Institute (IAT), a leading professional service firm recognized as a KM sensitive firm. We explore in-depth the:

- KM infrastructure in IAT (people, process and technology);
- business mission elements;
- value proposition elements;
- essential bodies of knowledge that contribute to both the mission and the value proposition;
- identification of critical knowledge area through the ongoing deliberation process of the senior executive group;
- differential capabilities that possess IAT and hold the business mission and essential bodies of knowledge;
- value creation ways from identified critical knowledge area via the value proposition;
- identification of measures of critical knowledge areas associated with performance; and

- test if this critical knowledge area held by KM infrastructure (people, process and technology), by the business mission, and by value proposition associated both to differential capabilities and to the value creation ways, really enhance the sustainable competitive advantage at IAT.

This paper uses the IAT case as the basis for developing a framework for organizing the relationships between KM elements and a competitive advantage. To motivate the need for such a framework and to provide some additional context for this work, the following section revises the existing knowledge view of the firm literature for each studied element in the case study. The third section describes the research approach and method used to study the IAT case to develop the commented framework inductively. The fourth section shows the findings. The fifth section provides the conclusions and the sixth section describes the recommendations for further research.

Knowledge management

Several terms and definitions have been used in literature to describe organizational KM. They include various terms such as "intellectual capital management," "knowledge management," "corporate brain power," and "intellectual or intangible asset management." Klein and Prusak (1994) view organizational knowledge as an organization's intellectual capital and define it as: ". . . intellectual material that has been formalized, captured, and leveraged to produce higher valued assets." Gopal and Gagnon (1995) define organizational knowledge as, "the collective knowledge of an organization, its intellectual capital, is embedded in the personal skills, electronic databases, and other information repositories."

In addition, KM is defined as a formalized, integrated approach and managing an enterprise's articulated and tacit knowledge assets. These knowledge assets may include knowledge bases, documents, policies, and procedures as well as unarticulated expertise and experience across the individuals, groups, organizational, and inter-organizational domains. KM includes the development, implementation and management of the appropriate organizational infrastructure to enable the acquisition, generation, management and deployment of knowledge within the enterprise.

In the next subsection, the elements to study in the case are described.

Infrastructure elements

To successfully implement organizational KM that provides sustainable competitive advantage in an organization, it is important to understand the infrastructure elements required to support the acquisition, management and transfer of tacit and explicit organizational knowledge. Literature on organizational KM reveals three areas of emphasis: people, process and technology. A review of research studies by various authors' results in the emergence of three core themes related to organizational KM.

(1) People. There are two main aspects of infrastructure's people element: culture (Leonard, 1998; Ulrich, 1998); and roles (Herschel and Nemati, 2000). As Ernst&Young CKO, John Peetz states, "to create an effective knowledge sharing culture, an organization must champion the value
of the knowledge process, integrate knowledge sharing into training and staff development processes, constantly communicate and promote internally, celebrate successes, and establish a clearly defined infrastructure which everyone in the organization understands" (Muzumdar, 1998).

Therefore, it is analyzed, on the one hand, if culture in an organization facilitates this critical role of knowledge in an organization, and, on the other hand, if the employees, individually,

development several explicit and functional tasks about organizational knowledge. Culture, elements are analyzed are:

- employee's labor is very important to organization;

- fellowship and collaboration is promoted among peers;

- teamwork interest is preferred to individual work;

- culture fosters teamwork;

- it's sharing with others work teams or all organization, documents and knowledge generate by a specific work team;

- there's interest in KM;

- the competences concerning personal KM-oriented attitudes are evaluated;

- an internal training plan is orientated to generate and share knowledge;

- employee selection considers the competences encouraging KM;

- personnel satisfaction is measured considering the knowledge acquisition and application;

- creation of internal forum to reflection, debate and practice that enable ideas exchange among experts with similar and complementary knowledge is encouraged;

- creative thought is emphasized, seeking to create high levels of quality working life where people are free and identified with initiatives and projects that they promoted;

- there's an open and positivist attitude toward organizational change, and seen as normal; and

- failures aren't punished, are learning challenges.

The second aspect related to the people element of the infrastructure is clearly established roles and attitudes:

- employee's education level;

- leaders that agglutinate knowledge;

- exclusive personnel for KM;

- compensatory policies adequate to enhance education levels and KM;

- the set of employee's skills and abilities are known;

- employees attend professional meetings, conferences or other discussion forums that contribute utilizable knowledge and experiences;

- workers are involved in projects with external partners;

- personnel is implicated in external activities that promote monitoring environment shifts and thus stimulate self-criticism, shift and organizational learning; and

- the firm is innovative and knowledge intensive due to its employees.

These elements (culture and roles) help leverage infrastructure's ''people'' element, which also contributes to the critical knowledge area, identified enhancing sustainable competitive advantage.

(2) Process. Knowledge process infrastructure in an organization also determines how much a critical knowledge area can contribute to enhancing its competitive advantage. Analyzing this infrastructure element, literature (Hedlund, 1993; Nonaka and Takeuchi, 1995; Bonora and Revang, 1993) proposes descriptions of several knowledge processes in diverse stages and, second, the analysis of managing and monitoring these knowledge processes and if it helps that a critical knowledge area identified enhancing sustainable competitive advantage, leverage.

Fundamentally, there are five knowledge processes (Hedlund, 1993):

(1) Knowledge acquisition/generation:

- responsibility assignment to a group that takes upon itself the collection of external information (magazines, internet, papers, visits . . .); and
- input information level of rest of personnel in this group.

(2) Knowledge store/retrieval:

- existence of analysis and filtrate system for information generated;
- personnel knows information stored and codification tools;
- existence of technical elements to access to information/knowledge stored;
- existence of some people who update information/knowledge stored;
- existence of access limitation to information about critical processes; and
- feasibility and velocity access to desirable information.

(3) Knowledge transfer:

- existence of put in common mechanism about experienced learning by several persons;
- transferring and sharing information regularly;
- eiffusing best practices;
- effectiveness in dissemination information; and
- quality level about information acquired.

(4) Knowledge application:

- usefulness of information stored; and
- existence of ratio about number of consultations per knowledge.

(5) Knowledge protection:

- existence of intellectual law rights; and
- existence of safety policies in computer systems.

These elements (every process) help leverage the "process" infrastructure element, which also contributes to critical knowledge area identified enhancing sustainable competitive advantage.

(3) Technology. The third area of emphasis is the role of technology in organizational KM. This element concerns the hardware and software systems implemented. Every analysis in this area is based on information systems literature (Davenport, 1996, 1995; Mann *et al.*, 1991; Hedberg, 1993; Armstrong, 1992; Rockart *et al.*, 1996; Strapko, 1990; Venkatraman, 1994). The elements concerned are:

- number of persons with computer in organization;
- use of email as normal labor tool;
- internet implementation;
- existence of Web site;
- existence of corporative intranet;
- existence of extranet;
- existence of efficient non-computerized knowledge supports;
- existence of explicit workflows;
- existence of document management system;
- existence of internal network where knowledge is diffused (databases, news, forums, chats, etc.);
- existence of electronic tools to seek information;
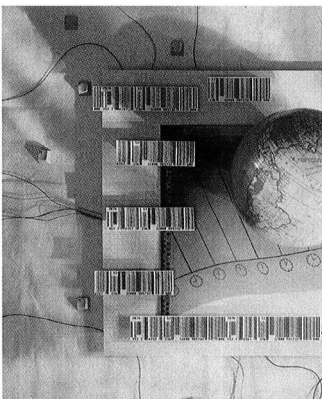
- existence of yellow pages (location of persons with specific profiles and skills);

- existence of Web server sharing information with customers, suppliers, universities, etc.; and

- computerized organization areas.

These elements help leverage the "technology" infrastructure element, that also contributes to inentifying critical knowledge area and enhancing sustainable competitive advantage.

Identifying critical knowledge area and competitive advantage relationships

After analyzing KM infrastructure elements, we propose identifying more critical or valuable knowledge areas for the organization. This is a central task in this study, which contributes a systematic method to identify this area, beginning with the analysis of three elements: business mission; value proposition; and potential critical knowledge (Thompsen, 1999).

Through this analysis, and after consensus about the question, a critical knowledge area is identified and this is congruent with the business mission and value proposition, and is directly associated with the infrastructure elements analyzed previously.

This three elements choice to determining critical knowledge area are based on the relationship, directly, among these elements, differential capabilities as differentiation source (Porter, 1980; Coyne, 1986; Hall, 1992, 1993), and creation value ways (Hamel, 1986).

Finishing the analysis process in this stage, first, differential capabilities and their elements are assessed to view their contribution to enhancing competitive advantage. These elements are shown in Table I.

To assess how organizational knowledge creates value in an organization, Hamel's four ways are taken into account (1996):

(1) developing new products and services;

(2) applying new knowledge to old products;

(3) creating value by globalizing deeply embedded local knowledge; and

(4) converting knowledge to strategic knowledge to create shareholder wealth.

Measures of critical lnowledge area

When a critical knowledge area is identified, it is necessary to obtain measures that determine the relationship between this critical knowledge area and the firms performance. We consider

Table I Differential capabilities and their elements

Functional capability	Cultural capability
Employee know-how	Perception of quality
Suppliers know-how	Perception of service
Customers know-how	Ability to manage change
Distributors know-how	Ability to innovate
Collaborator know-how	Team working ability
	Participate management style
Positional capability	**Regulatory capability**
Databases	Trade secrets
Reputation of product	Contracts
Reputation of company	Licenses
Networks	Patents
Value chain configuration	Copyrights
Established distribution network	Trademarks
	Registered designs
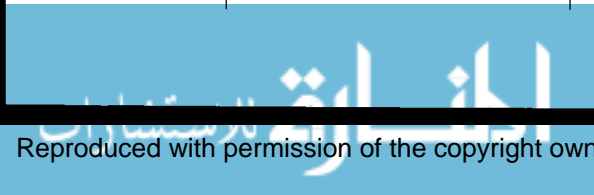
how to connect the established measures and points of competitive differentiation within the mission statement and value proposition to the definition of the critical knowledge area. We explore how to isolate, relate, or integrate any of the measures of the critical knowledge area with business results.

The intellectual capital literature shows several arguments for it. Edvinsson emphasizes that a company should only measure what is strategically important for growth (the things that will guide the company into the future) (Edvinsson and Malone, 1997; Stewart, 1994). The choice of indicators depends on the company's strategy (Sveiby, 1997). Stewart (1994) sums up the process in three principles: (1) keep it simple – having too many measures can blur focus and lessen their importance to users; (2) measure what's strategically important – having few measures increases the criticality of selecting measures which drive toward successful implementation of the company's strategy; and (3) measure activities that produce intellectual wealth. Identify areas whose leverage will increase the value of the product or service performed (Stewart, 1997).

Relationship between critical knowledge area and competitive advantage

A number of management researchers suggested the theoretical proposition that a key resource capability can serve as a source of competitive advantage and contribute value to an enterprise. This research was conducted to identify and measure a key resource capability. The purpose of this case study was to determine how to identify and measure a key resource capability, or critical knowledge area, in an enterprise to enhance competitive advantage, in the context of the emerging field of KM.

To understand how a firm may create a sustainable competitive advantage through a critical knowledge area by creating value as well as creating differentiation between itself and its competitors, two perspectives are presented: value creation ways and differential capabilities.

The interrelationships between organizational knowledge and the various elements lead to a sustainable competitive advantage. Organizational knowledge, part of human and organizational capital resources, is made up of explicit or articulated knowledge and tacit knowledge. A prerequisite for organizational knowledge to provide a sustainable competitive advantage is that it possesses the following four properties: it should be valuable; rare; imperfectly imitable; and non-substitutable or imperfectly substitutable. In order to explain how organizational knowledge provides a sustainable competitive advantage, two perspectives must be addressed and are depicted. From one perspective, organizational knowledge can provide a sustainable competitive advantage by facilitating value creation in four ways: by applying new knowledge to old products; by developing totally new products and services; by globalizing deeply embedded knowledge; and by increasing added market value. From another perspective, organizational knowledge can be leveraged to develop differential capabilities: process; cultural; positional and regulatory differentials. Differential capability creation and value creation can lead to a sustainable competitive advantage. Finally, the integrated people-process-technology organizational infrastructure required supporting organizational knowledge management.

Research method

In this section, the methodological procedures are described. The exploratory case study research design was selected for this study upon examination of the counsel of several experts. Authors that supported the selection of the exploratory case study design included the following: Long et al. (1985), Yin (1984), Robson (1993), Merriam (1988), Kerlinger (1992), Sproull (1995), Stake (1981), and Bonache (1998). The use of this methodology results in an indispensable understanding of phenomena at early stages in research, and when variables and relations are not defined (Snow and Thomas, 1994), such as occurs with KM.

Case-oriented methodologies are traditional in organizational/environmental research, have been used for examining management and information systems (IS) issues (Olson, 1981; Robey, 1981; 1983; Blanton et al., 1992; Muzumdar, 1997; Thompsen, 1999) and are the most common qualitative method used in information systems (Orlikowski et al., 1991). Marchall (1985, 1987) emphasizes the strengths, appropriateness, and value of a qualitative approach, or case studies.
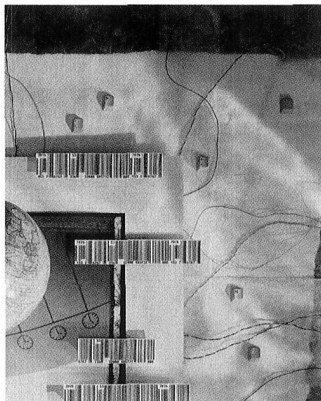
An advantage of using the case methodology is that the researcher is able to describe the relationships, which exist in reality within single organizations. Case studies also allow for capturing reality in greater detail than is possible using the survey approach and permit studying larger number of variables than is possible in surveys. Limitations in this methodology include restriction to a single event or organization, difficulty in acquiring similar data from a statistically meaningful number of organizations, a large number of situations and particular circumstances pertaining to lone individual situations, and different interpretations which can be placed in reality by individual researchers.

The purpose of this exploratory case study is to determine how an enterprise can identify and measure a key resource capability to enhance competitive advantage, in the context of the emerging field of knowledge management. Based on the literature on resource capabilities and strategic management, the term critical knowledge area has been formulated as a label for a key resource capability (Thompsen *et al.*, 1997).

In summary, this exploratory case study is aligned closely with the guidelines and conditions noted by each of these expert researchers. The study captured the holistic characteristics of a real-life situation of managers' deliberations in determining the identity and measure for a key resource capability, or critical knowledge area, and its use in enhancing competitive advantage. The study focused upon the ongoing deliberation process of the senior executive group to identify and measure the critical factors for the success of their enterprise. Since the nature of the business is knowledge-intensive, they were interested in determining whether and how any aspect of knowledge management should be incorporated with these critical factors and the measurement system they are establishing. Variables were not manipulated in this study. The research procedures drew upon multiple sources of evidence, including data collection and observations through interviews and a group meeting, as well as pertinent documentation. The study lays the groundwork for additional research.

In addition, the exploratory case study methodology is aligned with the research approach of a number of sources in the literature review. For example, Hall (1993) conducted similar case studies to test his proposed strategic analysis techniques for intangible resource capabilities. Nonaka and Takeuchi (1995) conducted multiple case studies to develop their model for an organizational knowledge creation process. Brown and Eisenhardt (1998), seed case studies, albeit with an inductive approach, to develop their competitive model. Roos and Roos (1997) applied deductive case studies to the first phase of research to test a preliminary process model for assessing intellectual performance in enterprises. Leonard (1998) conducted dozens of field case studies to explore the implications of processes, systems, and culture on KM. Sveiby (1997) completed a series of field studies to test his preliminary measurement model for KM.

The emphasis of this study focused upon description rather than conceptualization or the development of substantive, higher level theory. This study was conducted as a prelude for possible further study. The objective was to gain insight into what exists in a real-life situation, without the ability to manipulate any independent variables. The findings in this study develop a framework rather than generate new theory. The approach was clearly deductive since the literature had been examined several times, the findings were combined with experience, and a framework was constructed.

This holistic, exploratory case study of a single enterprise was an appropriate approach to answer the study research questions. This methodology had the capacity to produce the desired outcomes and build upon the existing foundation of research.

Research design

As stated above, the purpose of this study was, at first, to analyze a firm according to several elements described in the literature review of section two, and so, design a method to identify and measure a critical knowledge area as a key resource capability in an enterprise to enhance

competitive advantage, in the context of the emerging field of KM. The study was designed to answer the following three research questions:

(1) How can a critical knowledge area be identified?

(2) How can measures of a critical knowledge area be identified?

(3) How can a critical knowledge area enhance competitive advantage?

In order to answer these questions, individual interviews were conducted, historical documents were reviewed, and a group meeting of the senior executives of the enterprise was facilitated. Each of the interview questions focused on an element of the definition for critical knowledge areas. The following procedures were used in conducting the exploratory case study.

(1) The participants for this exploratory case study were the four senior management members of the Andalusian Institute of Technology (IAT), along with the rest of the personnel (technicians and administrators) of IAT.

(2) The chief executive officer was invited to attend an orientation meeting. The purpose of the orientation meeting was to ensure that the participants gained an understanding of the focus of the study, the research process, and mutual expectations during the study.

(3) An initial questionnaire was handed out among the IAT personnel, to detect the study's suitability in IAT, and to find potential sources for critical knowledge areas.

(4) A unique terminology was developing with the emergence of the field of KM.

(5) A report was presented to the four senior management members of IAT. This report informed about descriptive outcomes from initial questionnaire data.

(6) Individual data collection was conducted with the participants (individual interviews). The interviewees were the four senior management members. The interview guide appears in Appendix 1.

(7) A historical document review was conducted to identify potential candidates for designation as critical knowledge areas.

(8) Following a preliminary data analysis of the transcribed notes from the interviews plus the historical document review, a group meeting with the four senior management members was facilitated. The purpose of this group meeting was to stimulate discussion of the same questions used in the interviews. The interview guide appears in Appendix 2.

(9) An analysis of all the data collected through the individual interviews, the historical document review, and the facilitated group meeting with the senior management members was performed.

(10) Meetings with three external knowers was sustained to ensure and increase the construct validity of the study (Yin, 1994).

(11) The data analysis included an iterative process of categorical clustering, data reduction, pattern matching, triangulation of multiple data sources, and a search for alternative or negative evidence.

(12) An exploratory case study report was created, incorporating a review of the design methodology, analytical processes, findings, conclusions, and recommendations for future research. A draft report was provided to the case study participants to secure feedback on the accuracy of the evidence.

IAT was the organization for this exploratory case study. The Instituto Andaluz de Tecnología (IAT) is a private foundation, with a public interest, created by industrial engineers in 1989. It

operates in the field of I+R+D as an innovation and technology center, promoting activities of research, innovation and continuous improvement amongst companies, and collaborating with administrations in preparing and advertising its innovation projects and policies. According to recent information, IAT has almost 100 employees (75 percent graduated) and has reported approximately €3,000,000 in revenues.

In alignment with the research design advice of Katz (1953), Kerlinger (1992), Merriam (1988), and Yin (1994), in particular, this foundation was selected for the study based on the situation or phenomenon that is present. In recent years, IAT has been sensitive to considering these issues in its management. In fact, IAT participates in several projects where its role as precursors in KM themes has been recognized. In general, IAT has systematically engaged in strategic planning and analysis to refocus its business and establish sustainable competitive advantage. Their deliberations have included a search for the factors that are critical to both the short- and long-term success of the enterprise. The senior management members think that knowledge is that potential key factor, and this is why IAT seems an adequate organization to undertake an exploratory case study. This case study was conducted between May and August 2001.

Based on the literature review and similar case studies (Thompsen, 1999; Muzumdar, 1998), particularly the works of Penrose (1959) and Mahoney (1995), the mental models of management can have a significant effect on their deliberations and determination of which resources and capabilities can best serve the strategic or competitive interests of the firms. Furthermore, the close observation of deliberations of the senior management members in a single exploratory case study can, according to Yin (1994) and others, produce sufficient evidence to reliably provide a level of analytic generalization to a theoretical framework. The participation of the senior management members provided significant insight into the answers for the three research questions.

Throughout the case study research, the need to observe objectivity was recognized and followed. Research experts, especially Miles and Huberman (1994) and Yin (1994), exhort researchers to be concerned about ensuring that objectivity. Several steps are taken in this exploratory case study. IAT paid no consulting fees for any of the exploratory case study activities. The requested proprietary information security agreement was completed. All case study database documents, analysis materials, preliminary and final case study reports were pursued during the study. During the data analysis process, any evidence that revealed non-objective influence was coded.

In summary, the exploratory case study research design was selected for this study. In response to the need uncovered in the literature review, the exploratory study focused on the problem that few researches had been conducted to identify and measure a key resource capability in an enterprise to enhance competitive advantage, in the context of the emerging field of KM. On the basis of the literature on resource capabilities and strategic management, the term critical knowledge area was formulated as a label for a key resource capability. The three research questions were formed to clearly link to the problem statement and the purpose of the study.

The exploratory case study methodology and the procedures described in this section produced a description of how the participants, both individually and as a management group, established the identity and measure(s) for a critical knowledge area and the rest of the elements of the theoretical framework commented, for their organization and determined how it enhanced competitive advantage. The research design produced a holistic examination of the real-life situation of the organization, where there was no ability for manipulation of organizational variables.

Findings

In this section, the findings of the exploratory case study are summarized. The findings provide answers to the three main questions formulated above. Together to these questions, the infrastructure's findings are presented and a global framework is described.

These questions are answered in the context of the phenomenon for the case study. For a long time, the senior management group of IAT has been interested in KM and is involved in different

sorts of activities about such aspects, all of this implies an intense internal discussion. These discussions were intended to refocus the organization and to establish sustainable competitive advantage. The group prepared a mission statement and value proposition to guide their activities. They established a series of potential knowledge areas that they considered to be critical to the short- and long-term success of the enterprise. They also created a set of indicators similar to a dashboard system to monitor the condition of these elements. By virtue of the knowledge-intensive nature of the organization, the group declares an interest in determining whether and how any aspect of knowledge management should be included with the critical factors for ongoing strategic management. The four members of the senior management group served as the participants in this exploratory case study. The findings of the study for each of the three research questions are summarized in the following sections.

1. How can a critical knowledge area be identified?

During the individual interviews and the group meeting, the participants referenced their earlier discussions about critical knowledge areas in the organization, strategic plans, memorandums, internal documents, etc. The following knowledge areas frequently appear:

- training;

- innovation environment;

- contact networks;

- project management;

- employee know-how or expertise;

- team work; and

- quality.
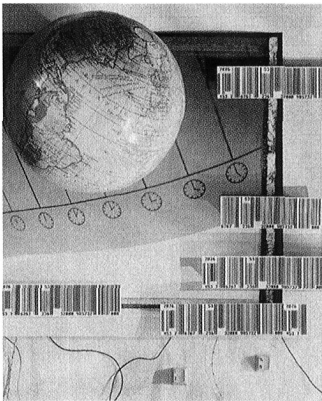
The participants stated that their knowledge about their organization and their experience created a predisposition to recall those factors. They repeatedly disclosed difficulty in reframing their managerial perspective of the enterprise in order to respond to the study questions. The participants examined the earlier choices for critical factors and the points of competitive differentiation within the mission statement and value proposition. They isolated a consistent, critical thinking approach and process that draws upon the knowledge of each of the themes to provide customer satisfaction. They acknowledged that this unique body of knowledge is the most important resource capability for the organization and serves as a key resource or basis for competitive differentiation. With this collective determination, the participants agreed upon the following identity of the critical knowledge area for the Institute:

> "Our critical knowledge area is knowledge about innovation environment, not only at regional level, but also at national and European level."

This response meets the definition of a critical knowledge area. This identity constitutes a body of knowledge that, in the judgment of the participants, is unique to their organization. This key resource capability lies at the core of both the institute mission and the value proposition to the customer of the organization. The participants' consideration and deliberation of the essential bodies of knowledge that contribute to the mission statement and value proposition, followed by the determination of the most important knowledge area, constitutes the answer to the first research question.

2. How can measures of a critical knowledge area be identified?

The responses of the participants in the individual interviews do not match any measures clearly, since only after the group meeting was it possible to isolate a critical knowledge area. Therefore, the participants stated their predisposition toward the established measures of the Institute.

After achieving agreement in the group meeting on the identity of the critical knowledge area, the participants shifted their focus to determine how to measure this unique knowledge area. They discussed how to measure the critical knowledge area itself. They considered how to

connect the established measures and points of competitive differentiation within the mission statement and value proposition to the definition of the critical knowledge area. They also explored how to isolate, relate, or integrate any of the measures of the critical knowledge area with business results. The group subsequently determined diverse types of measures for the critical knowledge area. These measures were:

- the number of enterprises helped by IAT in the R&D innovation;

- the number of projects led and participated by IAT, weighed whether the project is, for this order, regional, national or European; and

- the number of participations in reports or consulting in European, national or regional technological policies.

The sense of these measures is to monitor whether its evolution is coincident with the advantage position of IAT, concerning the knowledge of innovation environment, and, of course, whether this positively affects the results.

The participants in this study did not identify any financial valuation measures for the critical knowledge area although such measures are desirable according to the literature. The participants' deliberation and agreement upon these measures constitutes the response to research question two.

3. How can a critical knowledge area enhance competitive advantage?

The management group examined the links between the critical knowledge area and the established framework that appears in the competitive analysis and strategy formation documents. The discussion led to the determination that the critical knowledge area is a source of leverage for these differentiating factors. The participants indicated that this is a new perspective about the institute.

The participants stated that the application of the identity and measures of the critical knowledge area is expected to serve as a source of positive impact on organization results. They declared that the critical knowledge area identified would enable the improvement of the mission statement, through the differential capabilities and the value proposition through the value creation ways towards the customer.

Similarly, they agreed that critical knowledge area enhanced the sustainability of competitive advantage, to improve the organization reputation and competitive position (differentiation strategy). The participants also agreed to incorporate the information on the identity and measures of the critical knowledge areas in their future management decision-making. Specifically, they stated they would engage in "disciplined and consistent use of the critical knowledge area identity and measures." They also agreed to engage in "periodic testing of the critical knowledge areas and measures" to accommodate changes in the institute over time. They undertook to start an integral and explicit KM system, that included not only the identifying and measuring of critical knowledge area, but individual knowledge and skills of personnel in the organization. Thus, IAT has just hired a person in charge of undertaking that task. These stated action steps demonstrate an appreciation for not only the usefulness of the information but also the social value of creating shared understanding and involvement in its deployment.

In addition, several participants had taken into account they intended to privately contemplate these new insights and the impact that can be realized in management decision-making, practices and policies, strategy formation, and competitive advantage. The combination of these deliberations and responses constitutes an answer to the third research question.

4. KM infrastructure

After analyzing the set of evidence contributed by managers, by reviewed documents and by the rest of the instruments used in this study, it is noticed that the standing KM system in IAT is not integral and non-explicit, although there were potential elements that would be able to shape an effective KM system in the future.

The two main improvement areas detected by managers in their deliberations are:

(1) structuring and systematizing of incoming new knowledge; and

(2) individual skills inventory and management

In the rest of the analyzed aspects in the infrastructure, the organization reflects the existence of the rest of the analyzed questions in the "people-process-technology" system that shapes any KM system.

These are the main findings in order to analyze the basis of the KM system in IAT. Figure 1 summarizes the content and the main relations described in this section.

Finally, Figure 2 show the framework of the interrelationships between knowledge infrastructure, organizational knowledge and the various elements leading to sustainable competitive advantage. All these elements and its relationships facilitate the management committee identifying the critical knowledge area in a firm and ensures the leading and enhancing sustainable competitive advantage. This framework summarizes and assembles all of the elements just analyzed in the revision of literature and provides important implications for both research and practice. All of this is provided in the next section.

Conclusions

Several conclusions are derived from the analyses of the findings from this exploratory case study. These conclusions are presented as follows.

Figure 1 KM system in IAT
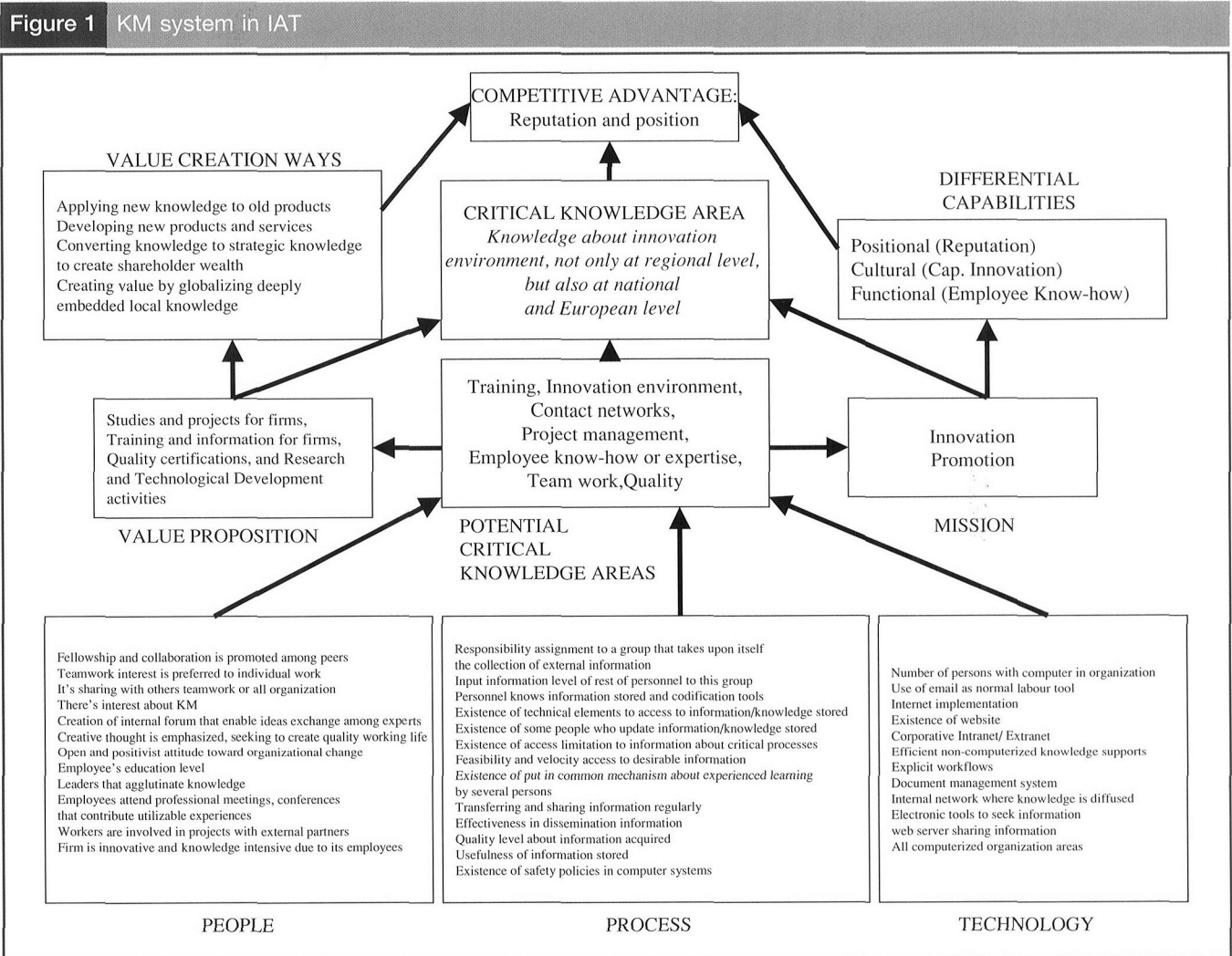
Figure 2 Framework linking KM and sustainable competitive advantage
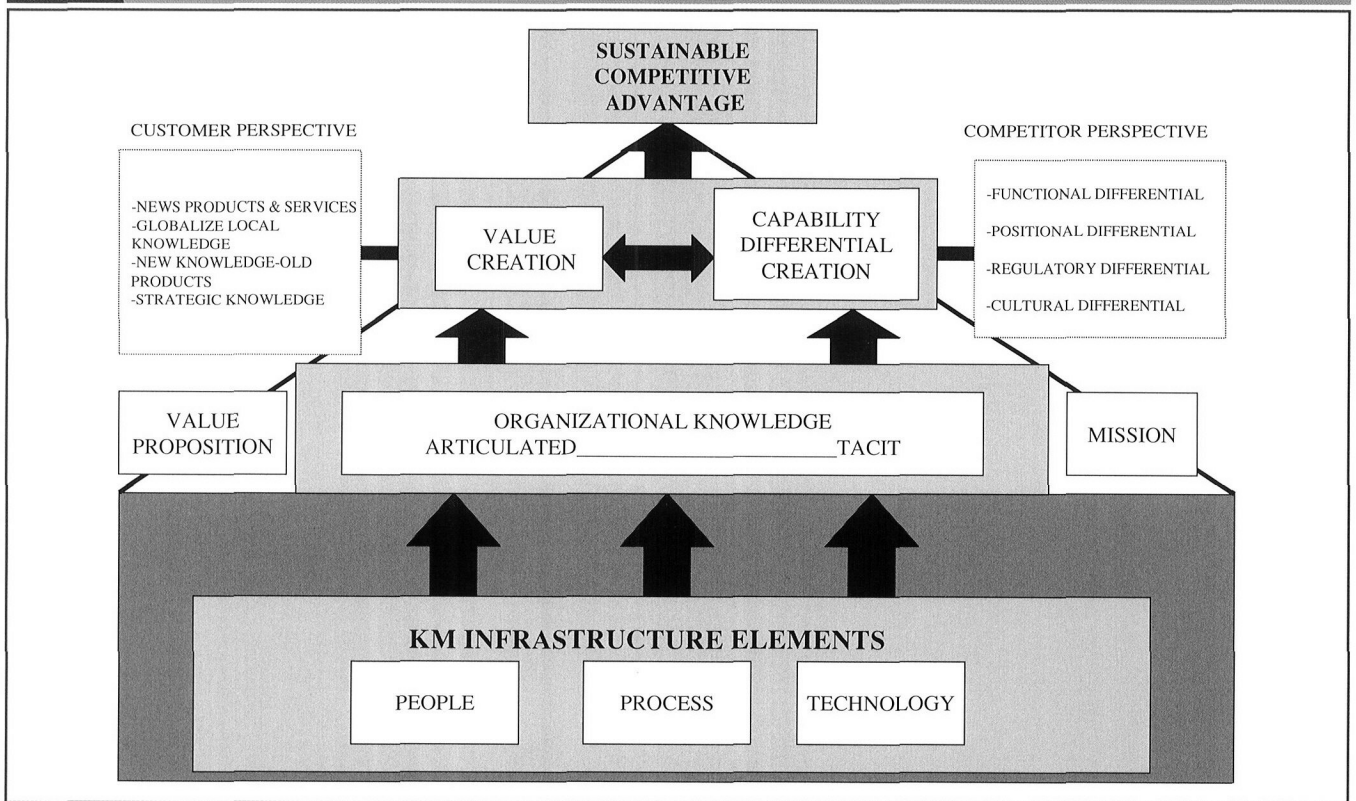
Based on the deliberation process and flow of idea generation and refinement in the findings, the identity of key resource capabilities, or critical knowledge areas, can be determined for an organization. This can be accomplished by examining the business mission, value proposition, points of competitive differentiation, and the essential bodies of knowledge that contribute to the carrying out of these key elements. Further analysis of the relevant bodies of knowledge can isolate a critical knowledge area that is unique to the organization and lies at the core of the mission statement and value proposition.

As noted in the findings on the eventual isolation of a unique body of knowledge, the identity of a critical knowledge area can create a new perspective on the enterprise and how it contributes value to its customers. The findings exhibited management's intent in creating and using a business planning framework of competitive analysis, strategy formation, and identification of critical success factors for decision-making and measurement. Such a business framework is designed to create a managerial mindset that is predisposed to focus upon certain factors. As the findings indicate, the participants found this predisposition as a source of difficulty in reframing their perspective of the organization. These findings and conclusions align with the research of Penrose (1959), Mahoney (1995), Leonard (1998), and Thompsen (1999) on the impact of mental models on the identification and selection of key resource capabilities that can serve in the best interest of the firm.

Drawing upon the management group deliberations in the findings, measures of a critical knowledge area can be identified by examining the contribution of that critical knowledge area to the points of competitive differentiation (differential capabilities and create value ways) within the business mission and value proposition. The findings and conclusions align with Sullivan (1998) and Muzumdar (1998) who noted that the purpose for measurement dictated the selection of measures. The desired precision for any measures of a critical knowledge area may require consultation with other people in the organization who have first-hand familiarity with the application of this unique knowledge.

Based upon the management group statements, a critical knowledge area can be considered as another success critical factor and important for management decision-making and the formation of competitive strategy. By examining the connections between the critical knowledge area and the points of competitive differentiation (differential capabilities and create value ways) within the business mission and value proposition, specific actions can be identified to leverage those points and enhance competitive advantage. A critical knowledge area can be a unifying factor in the development of an integrated strategy for enhancing competitive advantage. It can also be used to align infrastructure, policies, practices, systems, and processes to achieve fulfillment of competitive strategies.

Consistent deployment of a critical knowledge area is expected to produce a positive impact on business results and relative competitive position. The development of benchmarking data and subsequent measurement are required to confirm such results. These findings and conclusions build on the research of Hall (1993) and Kamoche (1996), which concluded that resource capabilities have important implications in management practice.

To summarize, the results and conclusions of the study are aligned with the theoretical proposition that the identification and measurement of key resource capabilities, or critical knowledge areas, in a firm can serve as an important and practical foundation for management decision-making and enhancing competitive advantage.

The identification and measurement of key resource capabilities, or critical knowledge area are essential steps in defining competitive forces and determining strategy. A critical knowledge area is another critical success factor that can be used in conducting situational and competitive analysis, formulating differentiating strategies, making strategic decisions, and aligning the organization infrastructure for strategy fulfillment.

The consideration of a critical knowledge area in management deliberations in a variety of scenarios can enhance competitive advantage and the potential for positive business results. The structure of an organization, its processes, systems, policies, and practices can be examined and adjusted to achieve greater leverage with the critical knowledge area. Some of these processes and systems include: acquisition/generation, store/retrieval, transfer, application, and protection.

A critical knowledge area can also be used as a benchmarking measure for the comparison of practices. Asset valuation and ownership policies can be more intentionally applied to the critical knowledge area. All of these are examples that demonstrate ways in which the identification and measurement of a critical knowledge area can impact management decision making and contribute to the economic value of the firm. These observations are particularly important for knowledge-intensive enterprises.

Recommendations for further research

This exploratory case study of a single organization provides a holistic examination of its senior management group's deliberation in identifying and measuring a key resource capability, or critical knowledge area, to enhance competitive advantage. On the basis of the findings and conclusions of this study, specific recommendations are made for further research:

- Multiple replications of this study is recommended to establish the basis for cross-case analysis and the potential for even more compelling evidence and conclusions. Multiple case studies also provide greater probabilities for external validity and generalizability of the theory.

- A longitudinal study that extends this initial research is also recommended. Such a study could be designed to establish baseline strategic decisions, measures, and competitive comparisons. Other procedures could be designed to isolate specific decisions that incorporate deliberation of the critical knowledge area and to track the relative measurable impact upon the business results and competitive position of an enterprise.

- Additional research is recommended to establish financial valuation measures for a critical knowledge area and the creation of a theoretical foundation for a business formula to identify a measurable return on critical knowledge.

To summarize, the results of these recommendations would be expected to build upon the theoretical foundation. This additional research would extend and enrich the findings and conclusions from this exploratory case study.

Acknowledgments

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Appendix 1: Data collection interview guide (individual)

Introduction of Interviewer

State the purpose of the interview:

- To collect preliminary data for the case study of three research questions: (1) How can a critical knowledge area be identified? (2) How can measures of a critical knowledge area be identified? (3) How can a critical knowledge area enhance competitive advantage?

- To identify potential candidates for the designation of critical knowledge areas in IAT.

■ To prepare for a facilitated group meeting with the senior management members in seeking answers to the three research questions.

Describe the process:

■ The interviewer will ask a series of 12 questions: four questions will be used to seek personal background information; eight questions will be used to seek information about IAT; questions about differential capabilities; the interviewer will record notes on the Data Collection Interview Guide; the interviewer will also tape-record the interview for case study purposes only; and the interview is planned to last approximately one hour.

Interview questions about personal background information:

(1) What is your current position at IAT?

(2) For what time period have you held this position?

(3) How long have you been with IAT?

(4) What role have you played in creating and using the management tools system for IAT?

Interview suestions about IAT:

(1) What is the business mission for IAT?

(2) What is the value proposition that IAT brings to its customers?

(3) What essential bodies of knowledge contribute to this value proposition and the business mission?

(4) Which knowledge area is the most important?

(5) Why do you think so?

(6) How would you specifically define and bound that knowledge area?

(7) How can this knowledge area be measured at IAT?

(8) How can this knowledge area enhance the competitive advantage of IAT?

Interview issues about IAT differential capabilities:

Stage 1: The roles of the capabilities in producing competitive advantage

REGULATORY	POSITIONAL	FUNCTIONAL	CULTURAL
Protectable in law	Due to the previous endeavor	Due to the skill & experience	Capabilities of the organization
.... %	.... %	.... %	.... %
contribution to CA	contribution to CA	contribution to CA	contribution to CA

Stage 2: The role of each intangible resource within the relevant capability

	%		%		%		%
Trade Secrets	......	Databases	......	Know how of:		Perception of:	
Contracts	......	Reputation of product	......	Employees	......	Quality	......
Licenses	......	Reputation of company	......	Suppliers	......	Service	......
Patents	......	Networks	......	Franchisors	......	Ability to manage change	......
Copyrights	......	Value chain configuration	......	Distributors	......	Ability to innovate	......
Trademarks	......	Established distribution		Franchisees	......	Team work ability	......
Registered designs	......	network	......			Participative management	......
Totals	100		100		100		100

Stage 3: The sustainability of competitive advantage. How sustainable are the capability differentials? i.e. how durable is the superiority of the key intangible resources?

Stage 4: The management of the key intangible resources. How should the key intangible resources be managed with respect to: recognition; protection; exploitation; and enhancement.

Appendix 2: Facilitation guide for a group meeting with the senior management members

Welcome the participants and give opening remarks.

Announce that this meeting is being tape-recorded for purposes of case study analysis only. All flipcharts, wallcharts, facilitator notes, and reference documents used during this session will be retained by the researcher for the case study database and subsequent analysis.

Explain the purpose of this meeting:

■ To collect data for the case study of three research questions: (1) How can a critical knowledge area be identified? (2) How can measures of a critical knowledge area be identified? (3) How can a critical knowledge area enhance competitive advantage?

Explain how the meeting will be conducted:

■ The case study researcher will serve as facilitator for the process.

■ As noted earlier, the session will be tape-recorded and all documentation will be retained by the researcher for the case study database.

■ The facilitated process will purposefully focus on questions that are similar to the data gathering interview questions. There may be additional questions to clarify information or probe more deeply as a result of preliminary data analysis of historical documents and the interviews.

■ Acknowledge that the participants may have additional insights since the interviews and such information will be welcomed and incorporated with the earlier data.

■ A desirable outcome is a consensus on the final response to each question.

■ Participants will be invited to refer to any documents as needed to achieve the desired outcomes.

Explain the guidelines for participation in the process:

■ The researcher invites open discussion in response to the questions.

■ The entire session will be conducted as a full group discussion to better capture the data on the tape-recording.

■ For purposes of clarity with the tape-recording, participants will be asked to speak only one at time.

■ Speakers are asked to identify themselves first, then offer a comment or response.

■ The researcher will occasionally give explanatory instructions or commentary for the record.

Announce that the case study database, including the proceedings of this meeting, will be analyzed by a process that is intended to ensure quality conclusions to the three research questions.

Announce that the researcher will create a draft case study report that will incorporate a review of the design methodology, analytical processes, and findings. The draft report will be provided to designated study participants to secure feedback on the accuracy of the evidence. Ask if the participants have any questions prior to commencing the facilitation of process questions.

Ask the participants to introduce themselves:

■ Name.

■ Current role.

The researcher will announce each of the following questions, invite all participants to offer comments, and facilitate open discussion to arrive at a consensus response.

(1) What is the business mission for IAT?

(2) What is the value proposition that IAT brings to its customers?

(3) What essential bodies of knowledge contribute to this value proposition and the business mission?

(4) Which knowledge area is the most important?

(5) Why do you think so?

(6) How would you specifically define and bound that knowledge area?

(7) How can this knowledge area be measured at IAT?

(8) How can this knowledge area enhance the competitive advantage of IAT?

Thank the participants for their active role in this case study research and their willingness to follow certain guidelines for creating case study database. Announce the possibility for the researcher to seek additional, clarifying information for the purposes of the data analysis.

Announce the probable data for the completion of the draft case study report.

Stop the tape-recording process.

Collect any flipcharts, wallcharts, facilitator notes, reference documents and tape-recordings for the case study database.