The IT Workforce Outsourcing Decision Model: A Managerial Strategy for Obtaining IT Skills and Capability

by

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Abstract

The increasingly global outsourcing[1] of IT work and other socio-economic trends,

such as pending baby-boomer retirements and low university enrollments in

computer science (CS) and information technology (IT) are prompting

fundamental changes in the availability of IT skills needed in both client and

service provider organizations. The purpose of this thesis is to present a new

model of the workforce outsourcing decision process, developed by the author,

which appears particularly relevant to the changing hiring environment. In

support of this model, this thesis will also report the results of a multi-university

study, in which the author was a key participant, to identify the skills, capabilities

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[1] The word "outsourcing" in used throughout this document to describe any work that is carried

out by an outside provider. The location of the work is irrelevant, that is the "out" in outsourcing

does not mean out side the boundaries of the country in which the client organization is located.

The term "outsourcing" has no relevance to where the outsourcing activity is taking place.

Unfortunately in recent publications the word "outsourcing" has come to mean outsourcing to a

location outside the country of the client organization. While this is not correct, it has become

common and therefore has introduced confusion in the meaning of the word. A table of the

numerous terms used in outsourcing has been provided in Appendix 1.

and experience[2] that are valued most by senior IT executives as they hire employees into the firm, rather than outsource them to an outside service provider (SP). The model proposed here is increasingly important in an environment where the human resource is a critical aspect of the firm's competitive positioning.

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[2] The phrase "skills, capabilities and experience" will be abbreviated at times, for convenience, in this document by the word "skills."

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However, to proceed in a more logical and chronological fashion, I will begin with thanking the ITWF teams for Phases One and Two of the Society for Information Management (SIM)-sponsored Research who contributed to create the data base used in this dissertation. They are listed in Appendix 2. In particular, Dr. Kate Kaiser, who led the teams and somehow managed to get a large group of independent academics to work together and *enjoy* it, has been a source of strength and support throughout this process. One team member, Dr. Cynthia Beath, is key as one of the outstanding colleagues whose feedback and critiques helped to improve the work reported here. The Society for Information Management sponsorship helped the ITWF teams to gain entrance into a large number of organizations for data collection and provided a forum for reporting results.

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Prior to joining the Stevens community, I was a member of the faculty at Fordham University Schools of Business. I began pursuing my doctoral courses at Stevens, while working for Fordham. Three colleagues there were instrumental in supporting my quest. Initially it was Dr. Peter G.W. Keen who invited me to join the faculty at Fordham and suggested that I pursue the doctoral degree at Stevens. Clearly that makes him responsible for the direction of my life for the

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Everyone mentioned above will breathe a great sign of relief that I have finally finished!

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1. Introduction

1.1   The Process of Outsourcing IT Work

The process of outsourcing IT work is increasing in popularity. Outsourcing is carried out in many different ways ranging from using local organizations to sending work to distant lands. The value of outsourcing IT work has been questioned from many viewpoints: economic, quality of work, social implications, security risks and structural impact on the home country workforce. Nonetheless, the outsourcing of IT work continues to increase. This fact, along with some negative history related to IT, e.g., Y2K conversion fears and the dot com bust, have created an environment where many believe that IT careers are fading from the U.S. and moving to other countries. This environment has resulted in a low university enrollment in Computer Science (CS) and Information Technology (IT) programs as students and their parents believe that there is no promise in an IT career.

Research associated with this dissertation indicates that there are in fact many excellent opportunities for careers in IT. Some of that research will be described in order to set the context for the model that is proposed. The model in this

dissertation is one that describes the IT workforce outsourcing decision used by IT Executives. It differs from previous models because it focuses on workforce capabilities rather than on economics or core competencies.

Using the workforce as a basis for outsourcing decisions builds on theories stemming from the work on Resource-Based View (RBV) where firm performance depends on its unique resources [Hedman and Kalling, 2001]. The proposed model focuses on capabilities rather than individual tasks. This approach is based in the research on absorptive capacity: "Absorptive capacity refers to the set of organizational routines and processes by which organizations acquire, assimilate, transform, and exploit knowledge to produce dynamic organizational capabilities" [Malholtra, Gosain and ElSawy, 2005].

The context research described here is based on analysis of a database of 96 interviews with IT management, focused on current and future hiring plans. The data was collected primarily in 2005 by a SIM-sponsored team of 20 international researchers[3] with a view toward developing a shared resource that could be studied from various perspectives. The author has been involved from the inception of the research project in the design of the method, in data collection and in data analysis. However, the outsourcing decision model described here is

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[3] Please see Appendix 2 for the names of the researchers.

independent of the research being carried out by the SIM team. The data that has resulted from the SIM research effort will be used to illustrate how the logic of the model is supported by the actions of IT managers in their decisions about obtaining the capabilities they need in their work.

The data from the SIM research consists of the answers to interview questions covering a wide range of hiring, training, and outsourcing information. A specific set of IT skills and capabilities were investigated.[4] Two time periods were discussed: 2005 and 2008. This data and associated analysis will be described in detail in the Methods section of the thesis.

These data provide a context and support for the IT Workforce Outsourcing Decision Model (ITWF Outsourcing Decision Model) which is relevant to understanding the logic involved in the creation of the model.

1.2   Contribution

The research in this dissertation should prove valuable to researchers, academics and practitioners. A conceptual model of IT workforce outsourcing decisions is proposed. This model characterizes how managers in organizations

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[4] Please see Appendix 3 for the complete list of skills and capabilities organized into 5 categories.

make the decisions regarding whether to hire in-house or seek their needed skills and capabilities through the mechanism of provider organizations, i.e., outsourcing. It should be noted here that, what had previously been the straightforward task of "hiring in-house" has become a more complex decision with the growth of "captive" centers. Captive center is the term used to describe the creation of an in-house workforce that is situated in a lower-wage location. This option for developing the IT workforce will be discussed.

For researchers it will provide a new view of the impact of outsourcing trends by looking at IT capabilities and their movement out of client organizations and into SPs. The model explains outsourcing decisions better than previous models based either on economics alone or on core competencies alone. The IT Workforce Outsourcing Decision Model proposed in this thesis can also be tested by other researchers in organizational field studies.

For academics, there is valuable information in how academic programs at both the undergraduate and graduate levels need to adapt to provide the changing skill sets required by organizations. The IT Workforce Outsourcing Decision Model clearly shows what skills will be needed in both client and service provider organizations. As a result, academic programs may design their IT-related courses to correspond to the blend of skills the marketplace is seeking.

For practitioners, there will be very clear patterns of skills that must be maintained in house versus those that can be outsourced to a service provider. In addition, there is an interpretation of how those patterns will change over time. The IT Workforce Outsourcing Decision Model can be used by practitioners to help assess their workforce strategy, i.e., the strategy they employ in making decisions to hire and develop talent in house versus obtaining the talent from an outside provider.

2. Literature Review

2.1   General Background on the Impact of IT Outsourcing

The literature available in both scholarly publications and elsewhere (industry publications, newsletters, etc.) has been a jumble of conflicting theories declaring the impact of outsourcing in IT as either positive or negative. As a result proponents of any position can find support for their arguments.

What has been missing in many instances is an unbiased, rational approach to determining the positive or negative impact of outsourcing in a specific decision making instance. It is also disturbing to see many contradictory articles with "best practices" in their titles along with many consultants professing their ability to impart "best practices" to their clients. The fact is that IT outsourcing is nascent enough that best practices are emerging and, while there may be some examples of organizations that have employed quality management techniques resulting in good outsourcing experiences, it is premature to trumpet the existence of definitive best practices in outsourcing.

Arguments in favor of outsourcing include the controversial, and highly publicized, paper by Carr [2003], where he brought into question the very significance of IT

to an organization. His thesis is that as information technology becomes more pervasive it will become more of a commodity and that investing in IT for differentiation or for competitive advantage is futile. This argument would appear to call for greater outsourcing of the IT function and a greatly reduced need for in-house IT skills and capabilities. Wikipedia, the popular on-line source of all knowledge defines a commodity as follows: "In the world of business, a commodity is an undifferentiated product, good or service that is traded based solely on its price, rather than quality and features." [Wikipedia.com, http://en.wikipedia.org/wiki/Commodity, 1/07]. Typical examples of commodities include electricity, crops (e.g. wheat, oranges), and metals (e.g. gold). However, while it is logical that something that is a commodity can more easily be outsourced because it is undifferentiated, there is considerable disagreement that IT as a whole can be characterized as a commodity. Rather there are aspects of IT that have become commoditized, e.g., computing cycles. The value that IT contributes to the competitive position of the organization is considerably more complex than the aspects which have become commodities. The human resource – the IT workforce – is one of those more complex aspects and cannot be easily traded as a commodity.

Other arguments focus on the specific examples of positive experiences with outsourcing in the form of case studies. There have been many published in the past ten years, but those described here are among the most recent. Rottman

and Lacity [2004b] propose twenty practices that they have found to be critical in both on-shore and off-shore outsourcing. These are derived from their 100 case studies of domestic outsourcing plus additional ones (number not given) of off-shore outsourcing. None of the twenty practices is directly related to IT workforce skills. There is one that recommends developing "meaningful career paths" for those engaged in outsourcing activities. The practices that are listed can be loosely categorized as focusing on improving management at the tactical level. The flaw in this approach is its tactical nature: there is no strategic view of the practice of outsourcing. Others support the concept that outsourcing is a strategic process (see for example, Gottfredson et. al 2005) and cannot be carried out successfully on a continuing basis until it becomes embedded in the IT strategy of the organization. The ITWS Decision Model proposed here raises the decision-making to a strategic level – one that is concerned with the development of the IT workforce within the organization.

Other research that supports IT outsourcing has had positive effects in the U.S., such as increasing IT jobs, IT productivity, and IT quality, while lowering IT costs [Rottman and Lacity 2004a]. There is some discussion here about improving management practices by developing an outsourcing portfolio and managing risk, but the overall focus remains operational rather than strategic.

Still others predict a labor drought in the U.S. that will require some jobs to move offshore [Ryan, Farrell and Doerflinger 2005]. This line of reasoning assumes that the U.S. can do nothing to improve the IT professional pipeline enough to fill the market needs of the future. In the face of low CS and IT enrollments in universities and the upcoming baby-boomer retirement, this is a significant argument. However, part of the basis for fewer young people getting into an IT career is the belief that it is not a good professional choice. This clearly describes a self-fulfilling prophecy. It is very important that a good understanding of the reality of a future in an IT career be established. Without this, the loudest voices will sway public opinion regardless of the facts. The workforce research that is described here demonstrates that there is an excellent opportunity in the IT workforce, that it is a worthwhile choice for college students, and that there will be many positions available in the coming years.

Some of the literature focuses on the importance of overall good management in carrying out outsourcing activities. Tapscott [2004], in a rebuttal of Carr, responded that companies with bad business models tend to fail, regardless of whether they use IT or not. In a recent Deloitte Consulting report, the authors conclude that outsourcing is complex and that results have been mixed [Anonymous 2005]. Their evidence suggest that most (70%) of the participants in the study had significant negative experiences with outsourcing and will be more selective in using it. The extent to which organizations apply high quality

management practices to their outsourcing activities will determine ultimate success or failure. This dissertation takes the position that decisions about outsourcing and its governance must become part of the overall IT strategy. To neglect this is to practice negligent management.

An assessment of workforce globalization found that businesses want to retain certain kinds of IT services and software work in the United States [Anonymous 2004]. The implication of "in the United States" is that the work would either remain inside the client organization, or, if outsourced, would be outsourced within the U.S. and not sent to a foreign location. While the article itself does not classify or interpret a long list of characteristics, the nature of the work that is listed can be classified into 3 broad categories: 1) *client facing*, that is, products or processes requiring iteration, personal interaction with end users, high management interaction requirements, extensive business or process expertise; 2) *complex*, such as uncertainty about customer needs, work that crosses many disciplines, applications with complex procedures, applications that involve a high degree of integration with other systems developed and maintained on-shore; 3) *creative*, for example, work involving nuances or deep cultural understanding, work in which much of the knowledge exists only in the minds of the on-shore IT staff, non-rule-based decision-making, high levels of creativity. This categorization begins to explain some of the more important characteristics that could be used to build a strategic approach to outsourcing decision making.

Several articles have applied theories from diverse fields to study IT skills and the approach to outsourcing. Ang and Slaughter [2001] have applied *social exchange theory* to the study of workplace attitudes and behaviors of contract and permanent professionals. Social exchange theory dates from 1958 when George Caspar Homans [1958] argued that there needs to be a balance between the benefits received in a relationship and the benefits given in the relationship. The theory relates social interaction with economics in an attempt to view human interaction rationally. When applied to outsourcing, social exchange theory suggests that the capabilities that are purchased through outsourcing are priced accordingly and therefore if the price is low, then the value of the work is low. Ang and Slaughter interpret this to suggest that contractors are typically given tasks with low task identity and low autonomy, often coding narrowly specified programs. Contractors have little business and industry knowledge. This approach ties the exchange of capabilities to the economic exchange in a very strong way. It does not explicitly take into account the wage/cost of living differences in different geographic locations. Therefore social exchange theory does not recognize that higher value work may be carried out for lower economic value due to economic differences based on geography. And while this approach is descriptive in measuring what has happened with outsourced work in its early days, it does not appear to be predictive of how outsourcing is beginning to be used. Client organizations initially saw outsourcing to lower cost locations as a

way to obtain commoditized services. Therefore they were choosing the lowest value work to "exchange" for low cost. As outsourcing is growing, the SPs are gaining more business and industry knowledge and changing the range of activities that they can perform for their clients. An interview with Azim Prenji, Chairman of Wipro, one of the leading SPs headquartered in India, clearly shows the intentions of this firm to increase the depth and breadth of IT-related services it will provide to clients [Rose 2006]. Assuming they are not the only SP with this goal, one can predict that the need for IT skills and capabilities at all levels, worldwide, will increase. To the extent that economic differences among geographically dispersed locations continue to exist, then the simplicity of the balance that social exchange theory requires will not describe the outsourcing exchanges.

Gomes and Joglekar [2005] have applied the *theory of transaction cost economics* to explore the nature of software development tasks that remain in-house. Transaction costs [Coase, 1937] are the various costs associated with using the efficient market, e.g., search and information costs, bargaining costs, policing and enforcement costs. This theory would argue that a client organization would not outsource any work unless the total transactions costs could be recovered in the savings of having the work done outside the firm. Gomes and Joglekar show that process asset specificity indicated by task interdependence and task size predicts outsourcing the task. If process asset

specificity is high, the task is not likely to be outsourced. (Process asset specificity will be discussed in more depth later in this dissertation.)

Ang and Slaughter [2004] use *Internal Labor Market strategies* to classify the human resource rules used to govern IT workers as industrial or craft strategies. Under the industrial strategy, employees enter the organization through a limited number of ports of entry and progress along clearly marked job ladders. They are selected based on high education requirements, receive training in skills and knowledge specific to the organization, and advance due to merit and personality. Under the craft strategy, employees often are viewed as having more loyalty to the profession than to the organization and that their skills are less organization specific and more mobile. Ang and Slaughter classified IT jobs into 8 categories - Chief Information Officer (CIO), Applications Manager (AM), Project Leader/Analyst (PLA), Programmer (PGM), Infrastructure Manager (IM), Database Administrator (DBA), Network Specialist (NWS), Systems Programmer (SP). They found that the more managerial jobs – CIO, AM and IM – are usually governed by the Industrial strategy, leading to lower turnover and higher tenure. The other, more technical, jobs were governed by the Craft strategy, leading to higher turnover and shorter tenure. An application of these strategies to the outsourcing question implies that the higher turnover, shorter tenure jobs are ones most likely to be outsourced, that is the more technical jobs.

Summary

In this section of the Literature Search several areas have been covered: 1) articles which provide an overall assessment of the goodness or badness of outsourcing and strong arguments can be found for both positions; 2) articles applying a variety of existing theories to understanding outsourcing. Each of these provides an understanding of an aspect of the capabilities that are outsourced, however, none provides an overall strategy for decision making.

2.2   IT Skills and Capabilities

Reviewing the literature on the skills and capabilities themselves reveals a number of interesting research projects that are related to this dissertation. Some of the literature focuses on entry level skills, some focuses on skills at all levels and in most cases looks at a mixture of technical and other skills

In the following studies, the focus of the research has been on technical skills and how the importance of a particular skill varies at different points in time. In a recent paper, Prabhakar, Litecky and Arnett [2005] reviewed the current IT job market and conclude that the need for development work in web-related applications has changed the demand for these programming skills. They report that these skills are mentioned in 42.6% of job ads. Specifically, Java has remained important and is required in more than one-fifth of all jobs. However, it

has not replaced the need for C++ and C programmers. SQL programming is also required in more than one-fifth of the job openings. Dot Net has grown in importance and now represents 13% of skills required by employers.

The demand for network skills was increasing in 1995 as increasing numbers of companies entered the world of the Web [Litecky, Prabhakar and Arnett 1996]. Koong, et al, noted in 2002 that expertise in Java, XML, TCP/IP and other Internet-related skills demanded higher compensation than other IT professional positions [Koong, Liu, Liu 2002]. Research based on systematic reviews of want ads showed that older IT skills tended to disappear from the advertisements, indicating less interest in hiring those skills on the parts of IT managers [Arnett and Litecky 1994].

All of these studies tend to focus on what the marketplace is seeking at a particular point in time. It is not surprising that the want ads reflect what firms are seeking. However, they do not help in understanding the strategy that an IT executive has for developing careers within his or her firm. These studies reflect the current operational needs.

Some studies have looked broadly at the importance of non-technical skills versus technical skills and have shown that managers rate non-technical skills higher than technical skills even for entry-level employees. In addition, managers'

expectations with regard to the non-technical abilities of new hires are usually higher than the actual ability the new hires exhibit [Cappel 2001-2002, Van Slyke, Kittner and Cheney 1998]. An earlier paper looked at the "expectation gap" between what skills and experience industry expects from college graduates in IT versus what they find [Trauth, Farwell and Lee 1993]. A survey of ACM SIGCPR proceedings resulted in the same general conclusion that non-technical skills were equally or more important than technical skills for IT professionals [Nakayama and Sutcliffe 2001]. In addition, managers have less of a preference for a specific programming language, but rather value the learning of programming concepts in any language [Cappel 2001-2002]. All of these studies focus on the need for non-technical as well as technical skills for IT professionals at all levels. These studies begin to look at a more strategic development of skills because they do not focus on only solving the current operational need.

In looking more carefully at only non-technical skills, ITAA [2004] found that interpersonal skill was the highest rated non-technology skill in the survey. Fifty-two percent of respondents cited this attribute, far more than any other. This preference proved true for IT and non-IT companies as well as companies big, small and in-between. A few variations also appeared when comparing IT and non-IT hiring manager responses in this area. IT companies placed substantially higher importance on project management than non-IT firms. The report suggests that project management may be more of a core competence for IT

firms—a critical component of what these companies offer their clients. This research is compatible with the conclusions from the SIM-sponsored IT Workforce research that will be discussed in more detail in this document.

Some of the skills research looks more closely at the relationship between skills and the quality of the IT work. An evolution of the relationship between clients and service providers proposes that under certain conditions "cosourcing" is an appropriate model that requires the parties to work in a close partnership, which results in an exchange of skills and capabilities [Kaiser and Hawk 2004]. The cosourcing approach raises the skills decisions beyond the operational needs and begins to look at the strategic aspects of deploying IT professionals.

Ross, Beath and Goodhue [1996] identify three IT assets for competitiveness. One of these is the human asset which they describe as an IT staff that solves business problems and takes advantage of business opportunities through the application of information technology. They conclude that the IT professional needs a blend of current technical skills, a deep understanding of the business and a talent for problem solving. Foote describes the "hybrid" IT job that requires multidimensional skill sets blending technology skills and customer focus [Foote 2005]. These studies indicate that the bar is being raised in the career of an IT professional: relying on technical skills alone will not guarantee career success.

Additional studies supporting the increased variety on skills and capabilities that are now part of assessing the quality of IT professionals' skills and knowledge. Two of these have established sets of skills/knowledge that should be measured: Technical Specialties, Technical Management, Business Functional, and Interpersonal and Management [Lee, Trauth and Farwell 1995 and Byrd and Turner 2001]. Generally the results of these studies have indicated that a blend of all of the skills is required for success as an IT professional.

Summary

In this section of the literature review the focus has been on research examining the specific skills and capabilities required for an IT professional to have a successful career. The research shows that the specific technical skills change to match the technologies that in current demand in the marketplace. However there is strong research support that weighs the value of softer skills – business and interpersonal – and finds them equally important for a successful career.

2.3   Inconsistencies between What Is Said and What Is Done

A study of classified advertising for IT positions at all levels from 1988 to 2003 found a recruiting gap exists whereby organizations say they want well-rounded

individuals with business knowledge and soft skills, however, they advertise for individuals with hard technical skills [Gallivan, Truex and Kvasny 2004]. The paradox is further explored in a study proposing a model for IS recruiting called Image Theory [Litecky, Arnett and Prabhakar 2004]. This research posits a two-stage hiring process that is used at all levels: Selection/Filtration Stage and Choice/Hiring Stage. The Selection/Filtration Stage is what is represented in job postings. It is the necessary technical background required for a position. The Choice/Hiring Stage is where additional skills and experience on the softer side come into play in the hiring decision. This article states that a study by SRI and the Carnegie Foundation in 2003 found 75% of long-term job success depends on soft skills and only 25% on technical knowledge.

The two-stage hiring process model indicates that while studies that focused on want ad patterns were pointing to technical skills as key in hiring, they may have been misleading. The technical skills were a hurdle to be in the game. But the softer skills not only came into the initial hiring decision, but led to career success in the longer term. The balance of technical and business (generally designated as "soft") skills is a key element in understanding how to prepare students for the marketplace. This will be investigated in this dissertation.

Summary

Research that focuses on the advertised skills that organizations seek in IT

professionals tends to overlook the two-stage hiring model. This model indicates

that there is an initial hurdle of technical skills required for an individual to be

considered for a position, but that the final hiring decision is usually made based

on other factors such as business domain knowledge and interpersonal skills.

2.4   The IT Pipeline

George, Valacich, and Valor [2005] examine the recent and rapid rise and fall of

university student enrollments in information systems programs and describe

how these enrollment fluctuations are tied to the job opportunities of graduates.

Drawing on the work of Ives et. al. [2002], they recommend that programs can

influence the number of majors they attract by focusing more on why information

technology is valuable to an organization rather than on what the technology is or

how it works. Foote reported a 10.3% decline in computer science undergraduate

enrollment from 2000 to 2004 and noted that UCLA had calculated a 60% decline

in undergraduates declaring computer science as their major from 2000 to 2004

[Foote 2005]. Other universities have indicated similar drops [Trewyn, 2005]

In the Gallivan, Truex and Kvasny paper they also determine a need for life-long

learning for IT professionals and the academics who teach them [Gallivan, Truex

and Kvasny 2004]. Cappel also addresses the issue of how students can better prepare for the marketplace requirements [Cappel 2001-2002].

Academic programs cannot prepare students unless there is a better understanding of how hiring and career advancement decisions are made. The changes in skill demand based on the complex, global marketplace must be studied and understood in order to evolve university programs to supply that market. This is not to say that market demand is the only driver of education. That position would be foolish and short term.

Summary

The key to improving the competencies of computer science and IT graduates is to blend the fundamental technical skills that will form a student's foundation for growth along with the business domain skills that will make that student attractive to the business community. There may be some students whose career goals are focused entirely on research and development in technical firms. There could be a track for this education that would be where the computer scientists of the future come from who will create new technologies – software and hardware – and explore the new frontier of computing. However, academic programs should also recognize the marketplace need for computer scientists who understand technology and business.

2.5 Resource-Based View (RBV)

As discussed earlier, using the workforce as a basis for outsourcing decisions builds on theories stemming from the work on Resource-Based View (RBV) where firm performance depends on its unique resources [Hedman and Kalling, 2001]. The research into how information and communication technology (ICT) improves strategy and can provide competitive advantage has been slow to recognize and value the RBV approach including the creation of a business model [Hedman and Kalling, 2001]. This appears to be because researchers looked at the technology itself as the resource and saw it as enabling other resources. They have not been looking at the IT workforce as the resource.

Roots of RBV can be found in two works that were published in 1933, independently but with approximately the same economic theory. One was the *Theory of Monopolistic Competition* by Edward Chamberlin (an American economist), introducing the notion that companies produce similar but not identical products or services and can obtain competitive advantage with slight differences [Chamberlin 1933]. Chamberlin is also the economist who first used the term 'product differentiation.' The second book was by Joan Robinson (a British economist), *Economics of Imperfect Competition*, and essentially introduced the same economic concepts. An amusing historical note is that Chamberlin anticipated a heated interaction with Robinson, however this never

happened as she was working with Keynes and became involved in additional economic theories. These two publications are considered the beginning of the idea that individual corporate resources could be seen as key differentiators in valuing products and services.

In 1959, Edith Penrose published *The Theory of the Growth of the Firm* and extended the concept of differentiation to include the idea that organizational knowledge supports organizational competencies which in turn contribute to the successful growth of an organization [Penrose 1959].

These foundational works have rarely been considered in research examining the strategic value of IT. Melville, et.al. [Melville 2004], discuss their role in fundamental theory, and Wade and Hulland [2004] cover the concepts in their review of RBV and its application to IT, but these papers are two of the few. (These two papers are discussed in more depth further in this section.)

Barney [1991] is recognized as one of the first to add specifics to the RBV "school" by summarizing the key resource attributes of RBV as value, rareness, the difficulty of imitation and substitutability. A resource that has one or more of these attributes contributes to the competitive advantage of the organization. IT skills and capabilities are within human resources that may have these attributes and therefore contribute to competitive advantage.

Critics of RBV suggest that there is a question about what is unique: the resource or the impact of the resource [Chatterjee 1998]. In the ITWF Outsourcing Decision model presented in this research the argument is that the collection of skills and capabilities that an IT professional has, creates a unique resource that has value, may be rare, may be difficult to imitate or may be hard to substitute.

Melville *et. al.* comment that their review of IT business value is unique as it "enables the integration of research assessing both the efficiency implications of IT application as well as its ability to confer a competitive advantage, heretofore separate research conversations." [2004, p.284] In summarizing some of the issues with IT business value research, the authors comment: "the treatment of the role of IT employees is unsystematic and often excluded from the analysis (ensemble view), hindering our understanding of the role of IT management and technical expertise." [Melville, et. al., 2004, p.286] They choose the resource-based view as the primary context for their work because it integrates the management and economic perspectives. For this same reason, RBV provides an important context for understanding strategy related to the IT workforce: management decision making can be integrated with economic decision making related to outsourcing.

In the excellent review paper by Wade and Hulland [2004] the relationship between RBV and IT research is explicitly explored. They point out the issue of defining 'resource' and demonstrate that the term has been used to include competencies in Prahalad and Hamel [1990] and skills in Grant [1991]. Wade and Hulland then define resources for their purposes as "assets and capabilities that are available and useful in detecting and responding to market opportunities or threats" [Wade and Hulland, 2004, p3]. They clarify that capabilities include technical skills, managerial ability and processes. They argue that RBV is a useful theory for IT research because it helps to relate IT to firm strategy.

A thorough review of RBV and its relationship to competitive advantage is beyond the scope of this dissertation. However, there are some general comments that must be made in order to support the argument that RBV can lead to competitive advantage and that IT has a role in this process.

What constitutes competitive advantage is the subject of a great deal of research. One school focuses on the organization's ability to deploy capabilities better than the competition. This view is offered by Christensen and Overdorf [2000] and was discussed in Day as well [1993]. The IT workforce consists of capabilities that must be deployed. Therefore this focus is consistent with a workforce model that aids in decision making based on capabilities.

A second viewpoint is that capabilities are developed and embedded in an organization over time and become difficult to imitate [Wade & Hulland 2004]. These capabilities can be developed and embedded in the IT workforce.

A third focus is that a firm may possess a unique resource, such as an employee with expert knowledge who cannot be lured away [Barney 1991]. This is a direct result of decisions about managing the IT workforce.

Resources have been placed into three broad categories [Day 1993]: inside-out (capabilities deployed from within the firm, e.g., technology skills), outside-in (externally-oriented capabilities that anticipate markets, competitors, and development, e.g., applying new technologies within the firm) and spanning (capabilities that involve both internal and external analysis, e.g., managing IT outsourcing relationships). Wade and Hulland [2004, pp. 124-128] summarize the effect of these three categories on the contribution of IT resources to competitive advantage in terms of moderating factors, such as top management commitment, environmental turbulence and environmental complexity. The ITWF Outsourcing Decision Model proposed in this research focuses on the human resource and demonstrates that the three broad categories of capabilities are all satisfied by workforce management, i.e., the CIO can ensure inside-out, outside-in and spanning capabilities are all present in the organization. This allows the

workforce mix to respond to the various moderators and thereby allows the IT organization the opportunity to contribute to competitive advantage.

Summary

Resource-based view provides a theoretical foundation for viewing the skills and capabilities of IT professionals as a strategic managerial decision. Thus it provides a foundation for the ITWF Outsourcing Decision Model to be presented in this dissertation.

2.6 Absorptive Capacity

The proposed ITWF Outsourcing Decision Model focuses on capabilities rather than individual skills. This approach is based in the research on absorptive capacity: "a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability" [Zahra and George, 2002, p.186]. Absorptive capacity (ACAP) is focused on the ability to assimilate knowledge and problem-solving skills for the purpose of creating new knowledge that will support innovation and ultimately benefit the organization by providing competitive advantage. Looking at capabilities in this broad sense is logical for the ITWF Outsourcing Decision Model, as it applies to staffing strategy and career development as opposed to the need for a specific skill, technical or otherwise.

The research on ACAP has resulted in a variety of definitions and a somewhat broad application of the concept to industrial economics, organizational learning, and the resource-based view among others. There have been different levels of analysis and multiple measures of ACAP. However, in their article, Zahra and George re-conceptualize ACAP and focus on two aspects that are important in its application in this research: 1) that the four capabilities usually associated with ACAP (acquire, assimilate, transform, and exploit knowledge) represent four dimensions of ACAP and are combinative, building to produce capabilities; 2) that there are two kinds of ACAP – potential and realized [Zahra and George, 2002, p.187-199]. The first aspect is applicable in this research in that the combinative concept supports strategic workforce development – top management would want to hire resources that have the most value to contribute to the organization, i.e., those that can carry out the four capabilities of ACAP. The second aspect is applicable in that the process of acquiring human resources embodies potential ACAP: the manager is acquiring and assimilating new human resources for the ultimate purpose of contributing to the organization's competitive potential. The transformation and exploitation concepts which make up the realized ACAP will be demonstrated in the work of the acquired human resources.

Cohen and Levinthal [1990] explore the understanding of ACAP on the individual and organizational levels. They relate ACAP to problem solving and learning capabilities at the individual level and then state that "An organization's absorptive capacity will depend on the absorptive capacities of its individual members." [Cohen and Levinthal, 1990, p.131]. In addition, they state "If firms do not invest in absorptive capacity in a particular area of expertise early on, it may not be in their interest to develop that capacity subsequently, even after major advances in the field." [p.137]. They go on to suggest that ideas may be locked out of a firm or be caught up in the "not invented here" syndrome because the ideas are too far removed from the firm's knowledge base, i.e., absorptive capacity [p.137]. This is an interesting issue for IT organizations that are outsourcing specific projects which cause knowledge to be gained within the provider's organization but may not cause the knowledge to be transferred back into the client organization. Given the lack of advancement of ACAP in a specific area, this negative result should be a concern to IT management and therefore should enter into the workforce development strategies that are pursued.

An interesting look at ACAP is presented in Malholtra, et.al., [2005] where they investigate the IT knowledge transfer between partners in supply chains. They argue that inter-organizational processes influence ACAP by enabling better acquisition and assimilation (two of the four aspects of ACAP) of information. They conclude that knowledge transfer does occur even when it is unplanned.

There is an analogy here with outsourcing partners. Malholtra et. al. suggest that the interdependencies between partners should be carefully and explicitly managed by structuring processes and information exchange. The process of structuring processes and information exchange are part of the governance arrangements in outsourcing agreements. Therefore this study may also support the improvement of ACAP in outsourcing arrangements. If this analogy is accepted, then the argument can be made that IT management should be concerned about managing this improvement in ACAP via outsourcing and incorporate the concern in their workforce development strategies.

Even the modern philosopher Mario Bunge supports the concept of ACAP, although he does not discuss it explicitly: "Because both the world and our knowledge of it are systems, the best specialists are the generalists, that is, the students capable of setting problems in a broad context, in making use of some of the knowledge acquired in other fields, or of foreseeing some of the consequences that their recommendations or actions may have for systems other than the one they are centrally interested in." [Bunge, 2001]

Summary

Absorptive capacity provides a research foundation for the ITWF Outsourcing Decision model which will be presented in this dissertation by establishing the

importance to the competitive advantage of the organization of acquiring, assimilating, transforming and exploiting knowledge.

2.7 Research Questions Resulting from the Literature Review

This literature survey has investigated previous research in a variety of areas that pertain to the strategy of IT workforce management in the current environment of IT outsourcing. There is an on-going debate as to whether IT outsourcing has a positive or negative impact on the client organization. There are many studies looking at the specific capabilities that are outsourced, but these are from the point of view of making a decision of which tasks or projects should be outsourced and do not put that decision in a context of an overall IT workforce strategy. This previous research suggests the following research question:

1) *If IT management has a focus on IT workforce strategy, can it improve the decision making practices on what to outsource and will this subsequently improve the impact of outsourcing on the organization as a whole?*

In the second block of literature the focus is on evaluating IT skills and capabilities required for a successful career. This is an important issue with respect to the ITWF Outsourcing Decision Model as having the skills desired by

the marketplace is critical to having a successful career. This raises a second research question:

>   *2) What skills and capabilities are required by the marketplace for a successful career in IT?*

In the third section, the literature on skills which are shown to be "in demand" by the marketplace is examined. Looking at the conclusions here presents a conflict between what is said in advertisements for IT professionals vs. what is considered in the hiring process. The focus on patterns of technical skills overlooks the two-stage hiring model where "softer" skills such as interpersonal and business domain skills are part of the process. This reinforces the importance of the second research question.

The fourth literature survey section covers research looking at the preparation of students in computer science and IT areas, i.e., the IT pipeline. This section also supports the second research question and raises a third:

>   *3) How should universities and colleges design their computer science and IT programs[5] to best serve the needs of the marketplace?*

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[5] This question is primarily one of undergraduate programs as demonstrated by the responses in the SIM-sponsored research project. The mix of capabilities viewed as valuable by organizations

The fifth and sixth sections of the literature survey investigate research into two areas which will serve as theoretical foundations to support the ITWF Outsourcing Decision Model. The resource-based view establishes the concept that an organization's success depends on its unique resources. Absorptive capacity research supports the concept that an organization's competitive advantage comes from its ability to bring new information in and apply it in a useful way. Together these concepts result in a fourth research question:

4) *Can IT management develop its human resource to benefit from absorptive capacity and gain competitive advantage?*

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at the entry-level has a significant impact, whereas at mid-level hiring, there is an experience factor which becomes very important. More details on this will be discussed in this paper.

3. Conceptual Model and Hypotheses

3.1   Introduction

The traditional model proposed for understanding the decision to outsource has been an economic one consisting of both the economics of efficient markets and service provider production cost. The following two sections describe these traditional models as background. Another section describes models based on business considerations. Following that the conceptual model proposed in this dissertation, the IT Workforce Outsourcing Decision Model, is presented.

3.2   Economics of Efficient Markets Model

The simple interpretation of this model is that an organization should seek the most efficient producer of the product and service needed and obtain it from that producer. Traditional economic theory [Smith 1776] argues that, because markets are efficient, i.e., those who are best (and "best" is assumed to include have the greatest skill) at providing a specific product or service already exist, it should always be more effective to contract out to the best provider than to hire. Ronald Coase [1937], the Nobel economist, argues that given the economic

theory of Smith, production could be carried out without the existence of firms. Coase then asks under what conditions firms should emerge. His answer to this question is the concept of "transaction costs." Transaction costs are the various costs associated with using the efficient market, e.g., search and information costs, bargaining costs, policing and enforcement costs. Coase then concludes that firms emerge when they can effectively produce what they need internally at a lower total cost including both production and transaction costs. However, he adds that there are natural limits to the size of a firm, when overhead costs increase and when managers become overwhelmed by resource allocation and begin to make serious mistakes. This will create decreasing returns.

Thus outsourcing has a long history in economics supporting the concept that unless the organization is the efficient and effective producer of the product or service, it should be obtained outside from the organization that is the best producer.

The pure economics of off-shore outsourcing has been explored in the work of Gomory and Baumol [2004, background 2000]. In their work, Gomory and Baumol are concerned only with the economics, are looking at all forms of outsourcing (not specifically IT outsourcing) and did not examine captive centers. They demonstrate that there exists a "zone of mutual gains" when a richer country shifts work to a poorer country. This comes from the poorer country

gaining economic growth while the richer country benefits from lower costs of production. Eventually this can become a "zone of conflict" when the salaries in the poorer country rise to the level of the richer country, creating a situation where the richer country is losing jobs and not gaining value.

These economic models do not explicitly look at skills and capabilities, as the concept of "efficient markets" incorporates the notion that the quality of the work is high. They reinforce the focus on costs as the primary decision factor in outsourcing.

3.3   Economics of Service Provider Production Cost Model

Ang and Straub [1998] focus on the economic determinants of IT outsourcing by studying the research constructs production cost, transaction cost and financial slack. Their research in banking demonstrates that the decision to outsourcing IT was strongly influenced by production cost advantages provided by service providers. Others have investigated various aspects of how the service provider can deliver economic value greater than that derived in house. Levina and Ross [2003] attribute SP economic value to the complimentary competencies that are developed through a relationship over time. This research is one that does recognize capabilities of the human resource as contributing to the value a service provide can deliver. Saunders et.al. [1997], found that one important

factor in addition to economic value was technological flexibility, i.e., the ability of the client organization to acquire flexibility, new skills and new technologies. Goles [2001] looked at relationship management in addition to economic value.

The last three research studies imply a value related to skills and capabilities, however, since the focus of these studies is the service provider organization, none of the studies explicitly examines the capabilities of the client organization's workforce.

3.4   Other Models Applied to the Outsourcing Decision

There have been other models applied to the outsourcing decision which look at business considerations. For example Luftman et. al. [2004] present a model based on examining critical success factors and core competency. The conclusion is that organizations should consider outsourcing arrangements when an IT function is both not a core competence and not a critical success factor. While core competency is related to the economic models previously discussed, the idea of a critical success factor is broader and can relate to many business considerations that cause an organization to succeed.

Lacity and Willcocks [2001] have a similar model comparing the contribution of the IT activity to business operations versus the contribution of the IT activity to

business positioning. They use the term "commodity" (as opposed to "differentiate") for the low end of the scale in contributing to business positioning, and the term "useful" (as opposed to "critical") for the low end of the business operations scale. The quadrant formed by "useful" and "commodity" is termed "outsource." As critical success factor is a broad concept in the Luftman model, "contributing to business positioning" is a similar broad concept.

These two examples typify the models focusing on business considerations. Some aspects of these models can be related to the economics of producing a product or service, but other aspects are broader and related to a variety of value propositions, e.g., reputation, customer service, etc. None of these models look explicitly at the IT workforce skills and capabilities.

3.5   The IT Workforce Outsourcing Decision Model

The model in this dissertation looks at the managerial strategy for obtaining and developing IT skills and capability. As opportunities to outsource some aspects of the IT function increase, it becomes important for the top management of IT to differentiate between the talent that will be groomed in house versus that which will be obtained via outsourcing.

Creating a strategy for the IT organization's workforce skills and capabilities may be more important than looking at the economic value or looking at business considerations. Organizations are often driven toward outsourcing solutions based on the belief that there is significant economic value in outsourcing. However, this assumption is being called into question as experience with outsourcing increases and organizations realize that there are considerable transaction costs associated with outsourcing. Many of these costs are not explicitly counted as part of the cost/benefit analysis for the outsourcing engagement. For example, investment in finding the right provider, which can involve site visits to the provider and customers of the provider, due diligence on the economic health of the provider, contract negotiations, etc., are often not included in the cost side of the argument. What organizations are discovering however is a broader value package that they receive from outsourcing that includes gaining flexibility in staffing, specialized technical skills, increased speed of completion, etc. Therefore using a purely economic model as the decision model for outsourcing is not sufficient.

The models that rely on business considerations have a degree of fuzziness related to the characteristics they are measuring. For example, the Luftman model uses the concept of critical success factors. The process of determining critical success factors is described in a research paper from MIT [Bullen and Rockart, 1981] and indicates that critical success factors should be determined

by the management of the organization and sometimes in that process, managers cannot agree on critical success factors. Other models refer to "core competencies" and this phrase is ill-defined and often debated at the management level. Therefore the models based on these ill-defined business considerations are not sufficient for making a strategic outsourcing decision.

The model proposed here focuses on the extremely valuable human resource and on how the IT leaders acquire, develop and manage that talent for the benefit of the organization as a whole. The model is based on a study of opinions and practices of a sample of senior IT executives. This research approach assumes that top management in the information technology function acts rationally in obtaining the skills and experience needed within the organization. Understanding which skills and experience sets are valuable and how they are obtained will shed light on the decision-making strategies used in assembling an IT workforce. The approach proposed here models the decision process in an attempt to better understand the key characteristics of the decision. Once the decision is better understood the model can be validated and provide valuable information for practitioners, researchers and academics in the field.

This model is proposed as a prescriptive model that can be used at the highest level of strategic decision making. The IT manager should understand the

parameters of the model and use them when making a decision between hiring

IT talent in house versus obtaining the talent through some form of outsourcing.

Figure 1 illustrates the decision-making process and where the ITWF

Outsourcing Decision Model plays a role.

ITWF Strategy Decision Overview
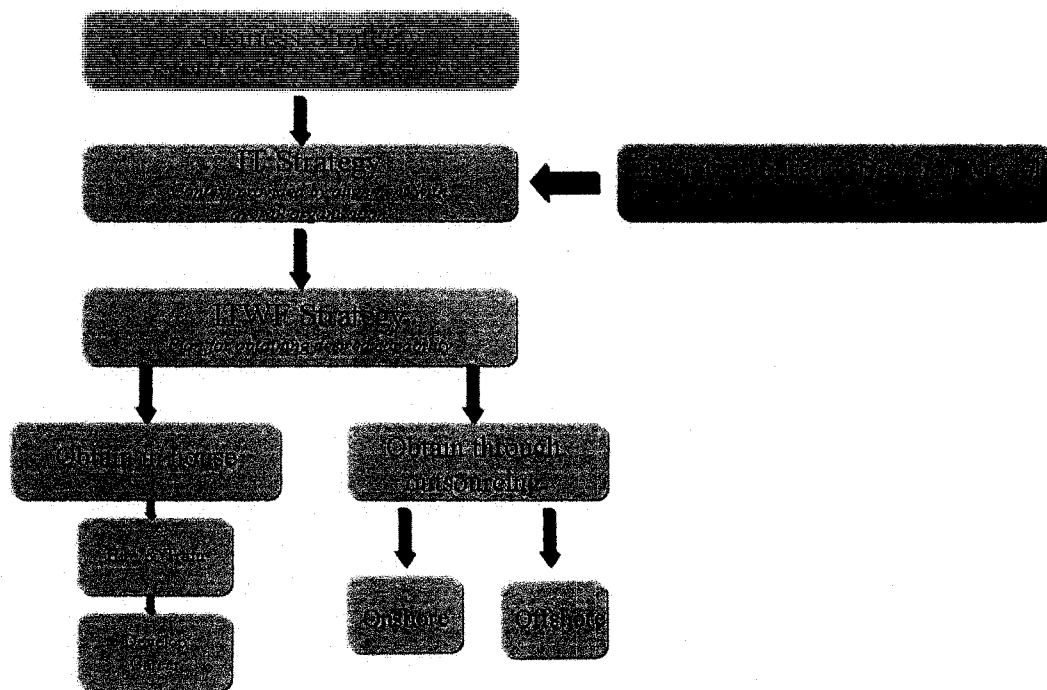
Figure 1: Where Does the ITWF Outsourcing Decision Fit?

Initially it should be used to formulate the strategic plan for the acquisition of IT

capability. For the future, it can be use as an on-going heuristic or rule of thumb

for helping to make each acquisition decision.

The conceptual model, an IT workforce outsourcing decision model, is

represented in Figure 2.

IT Workforce Outsourcing Decision Model
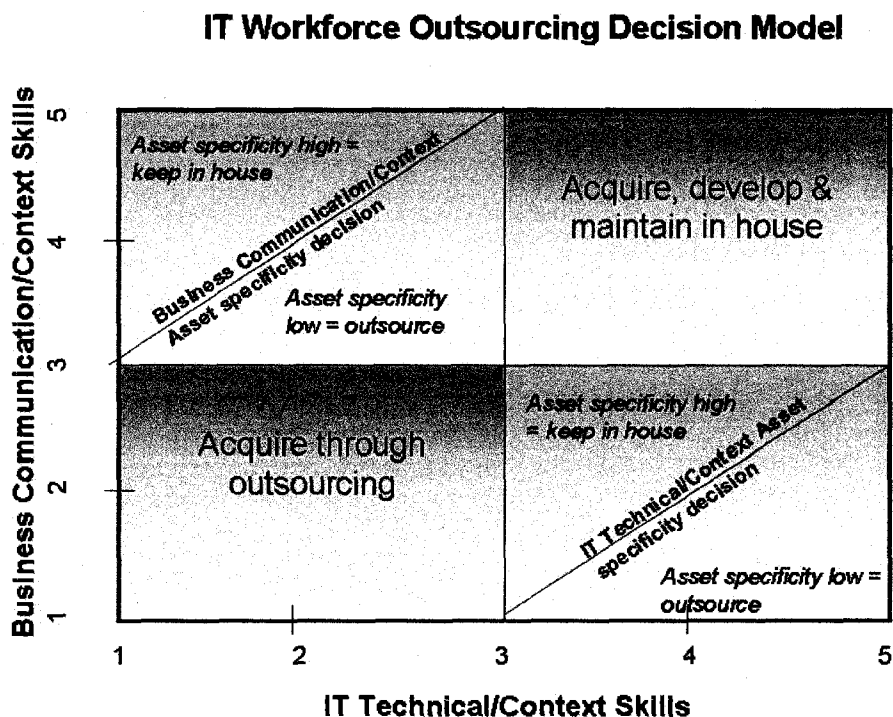
Figure 2: The IT Workforce Outsourcing Decision Model

The two-by-two model looks at business communication/context skills that are required on the y-axis (1=low to 5=high scale) and compares this to the IT technical/context skills on the x-axis (1=low to 5=high scale).

The scales can be best understood as follows:

1. Low to Medium
    a. IT Technical/Context: This is when skills and capability are standardized, that is, brought into conformity with a standard; capable of replacing or changing places with something else; permitting mutual substitution without loss of function or suitability. An individual standardizes when s/he conforms to a standard.[6] In the area of IT technical/context skills, some refer to this low end as skills that have become commodities. As commodities, the skills can be substituted by other individuals who possess the same standardized skill level. This does not mean that the skills are trivial or simple. Rather it means that the skills have been standardized to the point that they can be obtained equally well by hiring or by outsourcing. For example, both basic programming languages and

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[6] http://www.dictionary.com

advanced programming languages are available throughout the

marketplace.

There is a low to medium requirement for any IT contextual capability to

adequately perform the skills. More examples illustrating the scales will be

found in Figure 3.

    b. Business Communication/context: The low to medium half of the

       scale encompasses basic language and interaction skills without

       any requirement for the business context. Analogous to the

       technical scale, this does not imply a judgment of the complexity of

       the skills, but rather their standardization. For example, speaking

       the native language well may not be simple, but can be learned

       through a standardized program.

2. Medium to High

    a. IT Technical/Context: This is when skills and capability are

       specialized, that is, developed or designed for a special activity or

       function; adapted to a particular function or environment; caused to

       undergo specialization. An individual specializes when: s/he

       pursues some special line of study, work, etc.; has a specialty; is

       invested with a special character or function; adapts to special

conditions; particularizes.[7] In the area of IT technical/context skill, this end of the scale encompasses, for example, IT capability that has been created through experience with the specific organizational context, (e.g., an inventory system that has been in place for a period of time and requires knowledge of specific terminology, knowledge of how the system evolved, or how it is related to other systems); specialized IT knowledge of a new or emerging technology. Depending on the level of pure IT capability or the combination of pure IT capability and the context knowledge, this skill level at the highest end may be unique.

b. Business communication/context: This half of the scale encompasses, for example, a high level of communication skill and comfort in dealing with top management executives; business knowledge related to the specific organization or industry; context-related knowledge of the organizational history and/or power relationships within the management structure. At the very highest levels of capability, this skill level may be unique.

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[7] *Ibid.*

Additional detail on the scales is shown in Figure 3. These examples help to establish the continuum from a standard, substitutable skill (i.e., a commodity skill) to a specialized, potentially unique skill, i.e., one invested with special character or function and thus not easily substituted.

"Business communication/context skills" is a scale that examines the skills required for an IT professional in the process of interacting with and communicating with the in-house client. For example, business communication/context skills are not used when an IT professional is carrying out a programming task. On the other hand, when an IT professional is interviewing a client to determine that person's requirements for the development of a system, then there is a need for business communication/context skills such as general communication ability and business domain knowledge.

Bringing more detail and definition to the scale will help the practicing manager to use this model. The low to medium half of business communication/context is defined here as the basic tools of communicating in the business environment: knowledge of the native language spoken (e.g., English, French), facility with the native language, knowledge of basic business terminology (e.g., fiscal year, production run), knowledge of general business areas (e.g. accounting, manufacturing, marketing), comfort in communicating with peers (see Figure 3). These characteristics of business communication are straightforward, yet not

always present, especially in the newly minted undergraduate. When the author was teaching an introductory information systems course in an undergraduate program, basic business terms had to be clearly defined for the students to understand the application of technology to the business. For example, it was generally true that undergraduate students could not differentiate between "sales" and "marketing" and had no concept of "line management" versus "staff." The low to medium half of the business communication skills scale requires a minimal understanding of business terminology.

The medium to high half of the business communication/context skills scale is where the knowledge related to the particular business domain can be found. This includes company-related knowledge and terminology (e.g., "the Smith report"), industry knowledge and terminology (the FDA processes in a pharmaceutical firm or the consumer ratings reports in a manufacturing firm), knowledge of the user community (history with systems, attitude regarding IT, power and politics), comfort in communicating with higher-level managers and executives. Capability at this level usually indicates experience in the specific organization or industry as well as having developed confidence in communication skills in general.

Another way to look at the scale is to view it as a measure of asset specificity. Poppo and Zenger [1998] assert that asset specificity in a particular area

includes the development of a "language" that facilitates communication within an organization. In this view, the low to medium end of the scale is equivalent to low asset specificity, while the medium to high end is equivalent to higher amounts of asset specificity.

Recent publications, such as Carr [2003], are predicting that IT applications are becoming more standardized as our knowledge of how to carry out IT tasks increases. Carr has been criticized for carrying the concept too far as he claims that all of IT is moving in the direction of becoming a commodity and therefore concludes that it is not valuable for an organization to invest in IT. While some products of IT may be considered commodities, the work going into the designing, integrating, operating and supporting of the products may not be commoditized. The X–axis in the model recognizes that some IT skills are standardized and can be considered commoditized. A commodity is a product or service that is undifferentiated, i.e., no matter who produces it, the end result is equivalent. Typical commodity products are agricultural products such as soybeans and wheat or fundamental resources such as crude oil, gold and diamonds.

At the high end of the x-axis are those IT skills and capabilities that are not commoditized. These skills may require special training or experience, skills developed in customizing IT within an organization, history of the specific systems, history of the business processes, or even knowledge of new

technology that is only recently available in the marketplace. As with the

business communication scale, this scale also represents asset specificity (see

Figure 3).

Business Communication/Context Skills	Low to Medium	Medium to High
	Knowledge of native language	Company-related knowledge and terminology, e.g. "the monthly report"
	Facility with native language	Industry knowledge and terminology, e.g. "the Blue Book"
	Knowledge of basic business terminology, e.g. fiscal year, production run	Functional area knowledge and terminology, e.g. "the Sales report"
	Knowledge of general business area, e.g., accounting, manufacturing, marketing	Knowledge of the user community, e.g. history, power, politics
	Comfort in communicating with peers	Comfort in communicating with higher-level managers and executives

IT Technical/Context Skills	Low to Medium	Medium to High
	Undifferentiated knowledge regarding technical products	Company customized systems knowledge
	Commoditized knowledge that can be applied in any project	Business process knowledge
	Standardized programming languages	Knowledge of functional area technologies, e.g. accounting systems, manufacturing systems
	Standardized systems analysis and design	Knowledge of industry-specific technologies, e.g., pharmaceutical industry technologies, media industry technologies
	Standardized telecommunications	Knowledge of specialized technical products
	Standardized networking	Knowledge of new/emerging technologies

Figure 3: Scale Definition Examples Used in ITWF Outsourcing Decision Model

The examples shown in Figure 3 are proposed here to help distinguish between the two ends of the scales of the model. They were not tested in the research and can provide an area for further research as will be discussed in Section 7.

The following discussion explains the logic associated with each of the quadrants shown in the model.

In the lower left quadrant the need is for low to medium level business communication/context skills and there is a need for low to medium IT technical/context skills. This combination implies that the skills required to perform the task are plentiful and can be hired in-house or found through outsourcing to a service provider. This quadrant is labeled "acquire through outsourcing" as the combination of low-medium business communication/context skills and low-medium technical/context skills often drives companies to make a decision based on economics as the most important factor. This does not mean all organizations will choose to outsource these skills, but it does imply that these are the most easily outsourced. Examples of skills that would fall into this quadrant are programming in standardized languages and mainframe operations skills.

In the upper right quadrant there is a need for medium-high business communication/context skills and there is a need for medium-high IT

technical/context skills. Here are found the skills that would be critical to maintain in house. Examples are business domain skills such as company and industry knowledge and client-facing technical skills such as systems analysis.

As with many two-by-two models, the two extreme quadrants, i.e., upper right and lower left, are very clear and usually well understood. IT management has understood that they can gain value by outsourcing the IT skills in situations that do not require highly developed business communication/context knowledge and use commoditized technical knowledge. This is where they seek economic value and are able to find service providers that supply the commodity skills for lower rates than can be paid for in-house skills. The skills in the lower left quadrant are those that have been termed "non-core" in many research studies. For example Lacity [2002] advises that companies outsource non-core capabilities [Lacity, 2002, p.29] once they have determined what is non-core, using transaction cost economics (TCE) to rate tasks' asset specificity. TCE can provide a basis for determining non-core, which for many organizations has remained a fuzzy concept.[8] However, it would seem in practice that most managers do not

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[8] The characterization of determining core and non-core as a fuzzy concept is based on management research, not cited here, which discusses the difficulty managers have with this terminology. Researchers have recommended substituting the concept of determining which activities or processes support (versus do not support) the competitive positioning of the firm. This latter approach seems to be having more success in practice. For example, many managers

understand this approach and have difficulty determining core and non-core

tasks. In addition Lacity points out that what is deemed non-core can change

over time. Nevertheless, Lacity provides support for the lower left quadrant of the

ITWF Outsourcing Decision Model that indicates acquiring skills through

outsourcing when the skills and capabilities required are standard and therefore

asset specificity is low.

There are a number of researchers who have relied on TCE as the key decision

factor in outsourcing decisions based on the evaluation of asset specificity.

Poppo and Zenger [1998] present a thorough examination of TCE in the make-

or-buy decision in IT services. Their conclusions are relevant to the ITWF

Outsourcing Decision Model. They found that measurement of factors is very

difficult and therefore that more research must be performed to create a valid

theory of the firm. However several of their conclusions support the concepts in

this model. First, they conclude that when asset specificity in a particular area

increases, management is less likely to outsource tasks in that area. Asset

specificity in a particular area includes the development of a "language" that

facilitates communication within an organization. The development of a language

is illustrated in Figure 3, for example, company-related terminology such as "the

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find it difficult to determine if IT is core or non-core (usually based on their perception of what

"core" means), however they find it more straightforward determining whether IT supports the

competitive position of the firm.

monthly report" or "the blue book." This is consistent with the ITWF Outsourcing Decision Model in the y-axis scale of the need for business communication/context skills. The development of an organization-specific language, often referred to as business domain knowledge, is key in client interaction. Poppo and Zenger concluded that outside markets, i.e., service providers, lack effective mechanisms for resolving internal coordination problems because they lack the language of the specific client organization.

Asset specificity can be used to differentiate between the ends of the scale in the x-axis as well: medium-high IT technical/context skills may include skills developed to support in-house, custom technology that does not exist outside the organization. Again, the upper right quadrant decision is clear: a need for medium-high business communication/context skills, plus a need for medium-high technical/context skills results in an overall need for high asset-specific skills and therefore, for skills that should be acquired, developed and maintained in house. For example, there is a need for individuals who know the in-house terminology ("the blue book") and know the specific technology that has been used to develop the reporting system (often including previous technology used in house in the prior version of the system, i.e., "the history").

The hypotheses that will be discussed are propositions arising from the ITWF Outsourcing Decision Model and relate to research question number 5. The hypotheses are being used to examine the validity of the conceptual model.

The first two hypotheses proposed are:

Hypothesis 1: IT skills are obtained through outsourcing when the business communication/context skill is low to medium and the IT technical/context skill is low to medium.

Hypothesis 2: IT skills are acquired, developed and maintained in house when the business communication/context skill is medium to high and the IT technical/context skill is medium to high.

The other two quadrants pose less clear decisions. The upper left quadrant of the ITWF Outsourcing Decision model is the intersection of the need for medium to high business communication/context skills combined with a need for low to medium IT technical/context skills. This quadrant requires careful decision making as to whether the skills are developed in-house or outsourced. One example of a decision in this quadrant is the one organizations make about the skills associated with a call center. Clients call on the personnel in a call center with technical problems that they are having. This puts business

communication/context higher on the scale than low to medium. The technical skills required to solve these problems are commoditized to the point that there are software programs that assist the call center personnel in responding to the calls. The management decision here is whether the business communication/context aspect of the skills outranks the level of the technical skills required. When it does, call center skills are acquired, developed and maintained in house. When the manager concludes that the business communication/context skills can be adequately provided by a outsourcing provider that already has the standardized technical skills, then the call center skills are outsourced.

There are many instances of the outsourcing of call center skills. One of the more well-known examples is the Dell Corporation. Dell made the decision to outsource two call center skill areas: one for external clients and one for internal technical staff. Their experience after several years was that the external client call center skills were successfully handled by outsourcing the skills, however, the internal technical staff requirement was not being successfully handled by outsourcing the skills.[9] This decision is consistent with the ITWF Outsourcing Decision Model guidelines: low to medium business communication/context was sufficient for the call center to deal with the external Dell customers; however it

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[9] Various articles in: http://www.callcentermagazine.com

was not sufficient to deal with the internal Dell employees. Internal support required more specialized business communication skills. The internal Call center was brought back in house by Dell.

Another example of the call center skill decision is when a major U.S. pharmaceutical firm decided to outsource their internal client call center to Canada despite an economic argument to outsource the skills farther off shore. They judged the value of the cultural and language context high enough that they chose a location where the business communication/context skills were rated higher.[10]

This quadrant represents a contingent decision where tradeoffs must be made to choose between outsourcing the skills or acquiring the skills in house. Since the IT skills are low to medium, e.g. commoditized either way, the tradeoff is centered on the business communication/context skill dimension. When the IT manager deems the business communication/context aspect is paramount, then the skills will be kept in house. One way to think about this is that the evaluation of the business communication/contexty skills is analogous to a quality issue: how high must the quality of the client interaction be to satisfy the needs of the organization.

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[10] Private interview with corporate management

The hypothesis related to the upper left quadrant of the ITWF Outsourcing Decision Model is:

Hypothesis 3: The skill outsourcing decision involves a trade-off when the need for business communication/context skills is medium to high and the need for IT technical skills is low to medium.

The lower right quadrant is the intersection of medium to high IT technical/context skills and low to medium business communication/context skills. These skills can be outsourced when the specialized IT skills can be obtained outside and when standardized business communication/context skills are sufficient. An example of taking this approach is when the IT strategy is to not build competency in a technical area for a variety of reasons, e.g., new and not well understood as was the case with web hosting in its early days. It can be unclear what the level of business communication/context will be and outsourcing provides flexibility to let the area become more developed before building competency. Other examples are web technologies (JAVA and dot Net), ERP and specialized applications such as video archiving.

The decision to not outsource capability can be seen in how large financial service firms have managed their mainframe skills. In one Fortune 100 financial service firm, the IT skills are medium to high because the systems are custom

designed and built in house. This firm decided to continue to acquire, develop and maintain their specialized mainframe technical skills because of the unique nature of their in-house applications.[11]

This quadrant represents a contingent decision where tradeoffs must be made to choose between outsourcing the skills or acquiring the skills in house. Since the level of business communication/context skills remains the same in either case, the key to this decision is the need for medium to high IT technical/context skills. When the specialized skills can be obtained in the marketplace and have little relationship to existing in-house technology (i.e., asset specificity is low), e.g. skills associated with emerging technologies, the decision may be made to outsource the skills allowing the organization to remain flexible rather than committing to the emerging technology. When the specialized skills are associated with the organization's existing in-house developed technologies, then the asset specificity is very high and the tradeoff would lead to keeping the requisite skills in house.

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[11] Private interview with corporate management

Hypothesis 4: The skill outsourcing decision involves a tradeoff when the need for business communication/context skills is low to medium and the need for IT technical/context skills is medium to high.

The skill outsourcing decision can change at different points in time. For example, as additional IT skills enter the commoditized arena, skills that were previously developed in house, can be considered for outsourcing. As a client firm works closely with a service provider, the provider can be increasing the depth of their knowledge of in-house systems and terminology and the client may decide to outsource to the provider skills in the medium to high business communication/context area as their level of comfort and trust increases. A Fortune 100 pharmaceutical firm made this decision after working with a service provider for three years and training the provider to develop the specialized business communication/context skills required.[12]

Another example of a move in skills is when a Fortune 100 consumer product company decided to outsource the entire IT function for one segment of the business. This organization wanted to update IT applications and technology that had previously been an entirely in-house system. They had no IT professionals already in house who had the specialized technical skills for the new technology.

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[12] Private interview with corporate management regarding a FDA-required trial tracking system.

They were able to find a service provider who had the technical skills (in the range from standardized to specialized) and the industry knowledge (providing the range in business communication/context skills) to take over the IT function.[13]

There is, however, a negative side to increasing asset specificity in a particular task. When the knowledge is technical, this knowledge can act as an impediment to the acquisition of new knowledge. Therefore technological change becomes an important contingency factor in whether tasks are kept in house or outsourced. Poppo and Zenger conclude that IT management must deal with ambiguous decision making when technological change is an issue. This conclusion is consistent with the lower right quadrant of the ITWF Outsourcing Decision Model: when new or unique skills and capabilities are required to perform a task, even though business communication/context is standardized, careful decision making is required to determine whether skills are developed in house or outsourced. Developing skills in house may be made more difficult by the existing asset-specific skills in place.

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[13] Private interview with corporate management

3.5.1 Rating of Skills/Capabilities by the ITWF Team Experts

The list of skills and capabilities shown in Appendix 3 were used in a survey among the expert ITWF team members to determine how they would rate each skill on the 1-5 scale. The team members did not have access to the actual model, but rather were asked to rate each skill twice. The first rating on the 1-5 scale (described by the examples in Figure 3) was carried out to indicate the IT technical/context level and the second rating to indicate the business communication/context level. The results of this survey show a point on the model where each skill falls based on the average of the responses) and are shown in Figure 4. [Where two skills came out with the same coordinate values, they are shown diagonal to each other, e.g., vt (working with virtual teams) and g (working globally).]
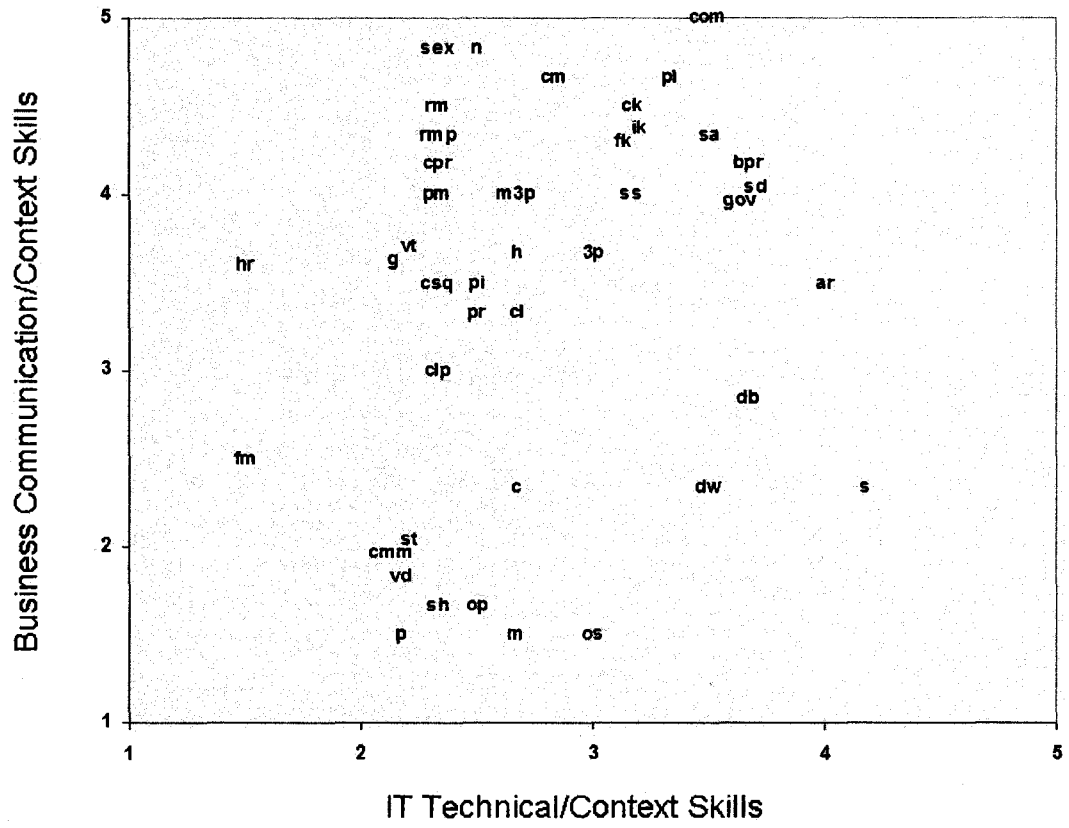
Figure 4: Ranking of Skills by ITWF Team

The text is difficult to read and is therefore summarized in the following table:

Upper Left Quadrant

Contracting and legal
Contracting and Lead SP
Change Management/Organizational
Readiness
Outcome/Product Service Co-Manager
Project
Customer selection or Qualification
Working Globally
Desktop Support/Helpdesk
Internal HR management
Negotiation
Project Integration/Program Management
Project Planning/Budgeting/Scheduling
Project Risk Management
User Relationship Management
Managing Customer Relationships
Managing Stakeholder Expectations
Working with Virtual Teams
Managing 3rd party providers

Upper Right Quadrant

Third party provider selection – Center Line
IT Architecture/Standards
Business Process Design/Re-engineering
Company Specific Knowledge
Communication
Functional Area Process Knowledge
IT Governance
Industry Knowledge
Project Leadership
Systems Analysis
Systems Design
Sourcing strategy

Lower Left Quadrant

Continuity/Disaster Recovery
Capability Maturity Model Utilization
Financial Management
Mainframe/Legacy
Operations
Programming
Server Hosting
System Testing
Voice/Data Telecommunications

Lower Right Quadrant

Database Design/Management
Data Warehousing
Operating Systems – Center Line
Security

Figure 5: Summary of Skills Ranking

The colors represent the original categories of skills used in the survey (and will

be used later in graphical representations of the skills):

Orange = technical skills/capabilities

Blue = business domain skills/capabilities

Green = project management skills/capabilities

Purple = outsourcing skills/capabilities (extended for phase 2)

White = IT administration skills/capabilities

These rankings are an indication of where the experts on the team would expect the skills/capabilities to fall based on the scales. Beginning with the two extreme quadrants lower left and upper right, the following sections will discuss the results of the ranking.

The items in the lower left rate low to medium on the business communication/context scale and low to medium on the IT technical/context scale. The majority of these items shown are in the survey category of technical. As predicted in the model discussion earlier in this section of the dissertation, the examples of technical skills "Programming" and "Mainframe /Legacy" fall into this quadrant. These skills are judged to be low-medium in both scales, making them skills that can be obtained through outsourcing. The absence of all business domain skills and all but one project management skill supports the logic that this is an area where skills may be obtained through outsourcing. It bears repeating that this does not mean they will automatically be obtained through outsourcing. Rather this means that they are likely candidates for acquisition through outsourcing.

The items in the upper right rate medium to high on the business communication/context scale and medium to high on the IT technical context scale. This quadrant contains examples from all of the survey categories, with the majority in the category of business domain. The model interpretation earlier in this section predicted that business domain skills and client facing technical skills would fall into this quadrant. Those skills are represented well in the ratings. The fact that the only IT technical skills in this quadrant are the ones that have strong elements of client-facing skills and knowledge additionally supports the logic that this is the quadrant where skills most likely will be acquired in house.

The items in the upper left rate medium to high on the business communication/context scale and low to medium on the IT technical/context scale. This quadrant contains examples from all of the survey categories, with the majority in the categories of business domain and project management. These results are consistent with the model logic because the skills shown cover a combination of those for which there will be a medium to high need for business communication/context skills, such as project management skills combined with a lesser degree of IT technical/context skills. These results are consistent with the explanation put forth earlier in this section indicating that this quadrant would require a decision based on the manager's judgment of asset specificity. Since the IT technical/context skills can likely be found through outsourcing (i.e., they are in the low-medium range), the decision as to whether

some of the skills will be in fact obtained through outsourcing will depend on whether those business communication/context needs can be obtained through outsourcing. In general, the outsourcing alternative will be chosen when there is an established relationship with a provider and that provider has built up the necessary business communication/context skills.

The items in the lower right rate low to medium on the business communication/context scale and medium to high on the IT technical/context scale. All of the items in this quadrant are from the survey category of technical. The three skills fully in this quadrant are "database design/management," "data warehousing," and "security." In addition, "operating systems" is situated right at the "medium" rating for the x-scale. The business communication/context rating is low therefore it does not provide a strong argument for acquiring the skills in house. A decision about the acquisition of these skills will depend on a management judgment as to whether the IT technical/context skills have a high enough asset specificity to warrant hiring in house for the skills.

The ratings by the ITWF team support the logic that has been provided earlier in this section which shows how the model can be used as a prescriptive model for determining hiring strategy. The ITWF Outsourcing Decision Model helps to focus management attention on key characteristics of the workforce that can be used to make outsourcing decisions. Using well-understood scales, e.g.,

business communication/context skills and IT technical/context skills, this model provides a practical way to look at the outsourcing decision.

3.6   Research Questions

Four (of the five total) research questions were identified as a result of the literature review:

1) *If IT management has a focus on IT workforce strategy, can it improve the decision making practices on what to outsource and will this subsequently improve the impact of outsourcing on the organization as a whole?*

2) *What skills and capabilities are required by the marketplace for a successful career in IT?*

3) *What capabilities should universities and colleges teach their students to best serve the needs of the marketplace?*

4) *Does the concept of absorptive capacity have relevance for IT management in the development of its human resource to benefit the organization and gain competitive advantage?*

The fifth research question that must be added as a result of the proposed model is:

5) *Does the ITWF Outsourcing Decision Model provide a practical tool for aiding management in making outsourcing decisions?*

The four hypotheses proposed are related to the fifth research question.

These questions will be examined using research data that was collected from 2005 to 2007 by a team of academic researchers from different institutions who were sponsored by the Society for Information Management (SIM) to investigate the impact of outsourcing, low enrollments in IT-related programs and the Baby-boomer retirement bubble on the IT workforce. The author was a member of this team and the entire team is shown in Appendix 2.

4. Research Method

4.1   Overall Discussion of the Research Method

The data used for analysis in this research was gathered by a team sponsored by the Society for Information Management (SIM) in the period 2005 to 2007. There were two phases of data collection. Phase 1 was focused on client organizations, i.e., those non-IT firms that outsource IT tasks and projects to service providers. Phase 2 was focused on service provider (SP) organizations, i.e., those firms that receive tasks and projects from other organizations (clients).

In both phases, the purpose of the data collection effort was to investigate the impact of outsourcing, low enrollments in IT-related academic programs and the baby-boomer retirement bubble on the IT workforce.

For Phase 1, the team of researchers, all of whom have extensive experience with interview-based research, developed an interview script. The research objectives along with appropriate demographic information were the focus of the design. Pre-test interviews were conducted to verify the practical use of the interview script.

The data was collected through structured, one-hour interviews between a researcher and a respondent guided by the written interview script, in order to maintain consistency in the database of interviews. Some of the interviews were conducted face-to-face and others via the telephone. Phase 1 represents data that is both quantitative and qualitative. The quantitative data was captured using the structured interview. The qualitative data was captured in allowing the respondents to discuss their IT workforce strategies in ways that went beyond the structured data being captured. Each respondent's information was captured in both a quantitative database and in the mini-cases that were written for each interview. All interviews were confidential with the identification of the organizations and individuals carefully masked. Organizations were assigned NAICS codes to place them into general industry categories. They were also

categorized by size based on revenue and number of employees. Individual respondents were categorized by titles and experience.

Target organizations were initially solicited from among 3,000 organizations who are members of The Society for Information Management (SIM). Other organizations (solicited from private contacts) were included as well. Data was gathered from senior IT managers located in two countries: the US and Ireland.

The data collected in the Phase 1 database was contributed by 20 academic researchers. The data was carefully examined for errors, logic and interpretation differences among the researchers. Some categories were collapsed to create logical groupings and increase the numbers in a grouping for better analysis. For example, the head of the IT organization may be assigned a variety of titles ranging from CIO to SVP to Executive Director. Where the information was available to make a determination, titles were aggregated to create the category "head of the IT organization," as the actual title was irrelevant.

As a result of the cooperative work of the members of the research team, a comprehensive database was created that each of the researchers can use independently for analysis. Thus the database is available to this researcher for the purposes of carrying out the analysis supporting this dissertation. However,

the conceptual model and analyses that make up this dissertation are independent from the work of other researchers.

The Phase 2 data was collected using an on-line survey that was developed from the Phase 1 interview script. This approach resulted in a primarily quantitative data collection effort (except for comments added by each respondent in open question areas, e.g. "Other" choices). The fundamental questions remained the same but were improved for independent access to allow the survey approach. In addition, the capabilities list was increased to incorporate capabilities that would be found in SP organizations in the area of selling their services (see Appendix 3 for the complete list of skills and capabilities for both phases).

Despite the fact that the author was closely involved in the creation of the database, this approach to research is considered secondary data analysis. Two key issues with secondary data analysis are described by Kiecolt and Nathan [1985]: 1) the existing database not containing data on all aspects which the researcher wants to explore; and 2) the existing database being overused and thus inhibiting creativity in social science research.

Since the data collection effort was not designed to explicitly test the ITWF Outsourcing Decision Model, it must be interpreted to apply to the model. The data and methodology do not allow for the hypotheses to be tested in a statistical

sense. However, the concepts of both the data collection effort and the model are very closely related and will allow an analysis to find supporting evidence for the proposed model. The data represents a rich collection of recent origin that is unique at the current time. Having access to this specialized data is a valuable opportunity for using it to explore and verify aspects of the ITWF Outsourcing Decision Model.

The existing database is recent and has only been used by the team of academic researchers; therefore, there is no concern at this point in its overuse. The research team as a whole has collaborated in producing academic papers and conference sessions looking at different aspects of the IT workforce issues, however, no outside researchers have accessed this database for any research projects.

Two additional methods have been employed:

- A survey of the SIM-sponsored research team of experts (discussed in Section 3.5.1)

- A case study to illustrate the practical use of the model (discussed in Section 6.1.5)

4.2   Research Questions of the Team Research Project

The research questions of the SIM-sponsored research project that are used in this discussion can be summarized as follows:

Research Question	Phase 1 – Clients	Phase 2 – Service Providers
What skills and capabilities do IT managers consider critical to maintain in house?	In 2005/06	In 2006/07
What skills and capabilities will be leaving in house?	By 2008	By 2009
What skills and capabilities will be becoming critical?	By 2008	By 2009
What are the skills that are desired at both entry and mid-level hiring?	In 2005/06	In 2006/07
What skills are moved to service providers?	In 2005/06	n/a
What are the reasons for moving skills to service providers?	In 2005/06	n/a
How many full-time equivalent (FTE) employees are maintained in house as opposed to with independent contractors and service providers?	In both 2005/06 and 2008	In 2006/07
Current Outsourcing: What types of service?	In 2005/06	n/a
Why are they [services] provided by independent contractors and/or third party providers?	In 2005/06	n/a
Entry-level: Which position has the most openings?	In 2005/06	n/a
Entry-level: Why will you hire a full-time employee for this position instead of using a contractor?	In 2005/06	n/a
Mid-Level: Which position has the most openings?	In 2005/06	n/a
Mid-Level: Why will you fill an opening with a full-time employee instead of using a contractor?	In 2005/06	n/a

Figure 6 Research Questions Used from SIM-Sponsored Research

4.3   Quality of the Database

The quality of a secondary data is an important issue in research. The data available from the SIM-sponsored research 22project is, in effect, the only data set containing the kind of data useful for illustrating the model presented in this research. Other data sets do not directly address the IT workforce questions

related to outsourcing decisions in organizations. There are data sets that address how much money firms spend on outsourcing, the length of outsourcing agreements, the overall success of outsourcing projects based primarily on financial criteria, countries involved in off shore outsourcing, etc. Most of these are privately held, e.g., by researchers or companies, and are not available to outside researchers. And - most importantly - do not contain data relevant to the skills and capabilities of the IT workforce internal to client and service provider organizations.

The reliability of the data set used here can be judged as high as the entire team of researchers was involved in reviewing the data for consistency and accuracy. After the Phase 1 data was collected, it was entered into an Excel database where it could be carefully analyzed to improve the data quality.

Responses that were substantially incomplete were removed. Responses that were illogical were removed, e.g., if a respondent indicated that they were NOT hiring at the entry level, but then discussed criteria for entry-level hiring, this data was removed as it was deemed hypothetical as opposed to actually based on the respondent's practice. Responses that contained errors that could not be logically corrected were removed, e.g., indicating the wrong geographic location for a firm's headquarters. The write-in answers under "Other" in skills were

analyzed and when a category of skills emerged as significant, it was added as an explicit category in order to not lose the value of reporting it separately.

4.4   List of Skills and Capabilities

Appendix 3 contains the complete list of skills and capabilities categorized into five categories of related skills for Phase 1 and six categories for Phase 2. Each category of skills represents the range of skills that might be of interest from entry-level to mid-level positions. Pre-testing the interview script demonstrated that the managers being interviewed interpreted skills and capabilities in two ways:

- as specific proficiency acquired or developed though training or experience, e.g., programming can mean learning C++ or Java programming;

- as the ability to acquire and apply skills in different settings e.g., a programming capability is the ability to learn and apply many programming languages in many settings.

These differences were captured in specific notes for each interview. The differences were not important in most cases. However, because the questions did not specify a skill to the detailed level of naming a particular programming language, the notes became important in understanding how programming could

be both something that was being outsourced and something that was determined to be critical at the same time. For example, programming tasks were outsourced and programming skill was considered a necessary skill for entry-level hires. In another example, mainframe programming skills were outsourced, while web-design programming skills were kept in house.

Another important aspect of skills and capabilities was whether they were "client-facing" skills. "Client" in this phrase is the client of the IT organization, which is usually an internal department or business area within the organization. "Client facing" is an activity that requires intensive interaction with the business client, requiring a common business language and sharing a common business knowledge base with the business users.

4.5   Indicators Used from SIM-Sponsored Data Set

The following indicators from the data set are used in this research:

- Demographics of respondents from phases 1 and 2

- Skills and capabilities and their categories (as shown in Appendix 3) for phases 1 and 2

- Patterns of FTE (full-time equivalent employees) distribution from phase 1

- List of critical capabilities from phases 1 and 2

- List of capabilities that clients outsource from phase 1

- List of emerging capabilities from phases 1 and 2

- List of declining capabilities from phases 1 and 2

- List of entry-level hiring capabilities from phases 1 and 2

- List of mid-level hiring capabilities from phases 1 and 2

- Types of services outsourced from phase 1

- Reasons for outsourcing services from phase 1

- List of entry-level positions with the most openings from phase 1

- Reasons why entry-level positions are being hired rather than outsourced from phase 1

- List of mid-level positions with the most openings from phase 1

- Reasons why mid-level positions are being hired rather than outsourced from phase 1

5. Data Analysis

5.1   Demographics

5.1.1 Phase 1 – Client Organizations

The total number of respondents in the Phase 1 study was 104 business professionals from 94 organizations. Eight of the interviews were deleted as they did not have useable information. The data set was reduced a second time by

removing the IT Software/Service Providers. Initially the research team solicited respondents from both client and service provider organizations. However, very few service providers were included in the total – only 15 organizations. When these were removed, the final data set for analysis consisted of the responses from 74 organizations. The decision was made to conduct Phase 2 where the data collection effort would be focused on service provider organizations alone, both to increase the numbers and to differentiate the needs of the SPs' internal IT from their needs resulting from client support.

The resulting data set consisted of interviews from 74 organizations. Figure 4 indicates the breakdown by industry type and size.

	Fortune 500	Large	SME	Total
Heavy Industry	14	4	4	22
Finance and Insurance	10	4	3	17
Professional Services		2	2	4
Other	10	9	12	31
Total	34	19	21	74

Figure 7: Organizations by Industry and Size

Note: Organization Size is categorized in USD revenue or for not-for-profit organizations in total expenses as follows:

Fortune 500 = $\geq$3B

Large = $\geq$500M and <3B

SME = <500M

Fortune 500 companies accounted for 46% of the respondents in the analysis.
This is a larger share than would be found in the population of organizations in
the U.S. The United States Small Business Administration states that over 99%
of U.S. businesses have less than 500 employees.[14] In this data set, the Small-
Medium Size Enterprises (SME) accounted for only 28% of the total companies.
The remaining organizations fell into the Large category, with the total being 26%.

In terms of industry classification:

- 30% heavy industry, consisting of mining, utilities, and manufacturing

- 23% financial services and insurance

- 5% professional services

- 42% from other industry sectors

The "other industry sector" respondents were from a variety of industry sectors
including healthcare, education, government, retail, entertainment, transportation
and logistics and not-for-profit.

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[14] http://www.sba.gov/advo/research/data.html

CIOs and senior vice president/vice president levels made up 61% of the respondents. The other respondents held responsible management positions (executive directors, directors, and managers). Over 60% of the respondents had been in their current positions three years or more and 89% had over 10 years experience in the IT field. Taken as a whole, the respondents are experienced managers with extensive knowledge of IT and IT workforce needs.

5.1.2 Phase 2 – Service Provider Organizations

The total number of respondents in the Phase 2 study was 142[15] for the analysis presented here. All respondents were from service provider organizations; therefore the industry breakdown is not relevant here. Figure 8 shows the size (by revenue) breakdowns and percentages.

	Fortune 500	Large	SME	Total
Service Providers	26	23	94	142
%	18%	16%	66%	100%

Figure 8: Organizations by Size

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[15] The total of 142 respondents is at the time of this writing. The data gathering effort was scheduled to end 7/31/07 therefore the final total would be a small amount higher.

Compared to the Phase 1 data, this data set has a much larger percentage of SMEs and is therefore more representative of the population of organizations that exist.

To act as a quality reference on the organization size, the size by number of employees was also calculated and turned out to be consistent with the size by revenue:

- More than 25,000 employees 19%

- Between 1001 & 25,000   20%

- Less than 1000   61%

Since all of these respondents are in the same broad industry group of service providers, there is no breakdown by industry. However it is interesting to look at the geographic representation of the organizations, as shown in Figure 9. The specific question that was asked was "Where is the headquarters office of your overall firm?" This was to differentiate between the headquarters nation of the firm versus a specific region where the individual respondent may be located.

Region	Number	Percent
North & South America	97	68%
Western Europe & Africa	8	6%
Eastern Europe & Russia	17	12%
Asia and India	20	14%
Total	142	100%

Figure 9: Organizations by Geographic Region

Thus Figure 9 indicates the location of the parent company and therefore gives a

sense of the variety of service provider regions represented in the data set.

5.2   Overview of Skills and Capabilities Questions

In both phases of the research, respondents were asked questions related to the

skills and capabilities that they need in the IT workforce. The complete list of

capabilities is shown in Appendix 3. There were four categories into which the

capabilities were sorted:

- Technical

- Project Management

- Business Domain

- Outsourcing

The Outsourcing category was expanded for the second phase to include

effective selling technique capabilities that the SPs might look for.

There were six questions asked related to capabilities, each of which used the

same list of capabilities as shown in Appendix 3:

1) What capabilities are critical (most important) to obtain from employees in 2005 (clients)/2006 (SPs)? Please do not include those outsourced from contractors. This question collected the lists of capabilities that managers deemed important to have as part of their in-house staff.

2) What capabilities will be obtained through outsourcing to a service provider?

3) What capabilities will emerge in importance (three years hence) or become more critical to obtain from your employees? This question collected the capabilities that were growing in importance in the next three years and therefore those that managers would be seeking to attract and maintain in house.

4) What capabilities will decline in importance (in the next three years) because they will become irrelevant, automated or outsourced? This question collected the capabilities that were declining in importance and therefore those managers were not seeking to maintain in house.

5) What IT capabilities do you want in entry-level candidates? This question collected the specific capabilities that managers looked for in entry-level candidates. This question was only counted when the respondent indicated that they were in fact hiring, indicated a number and chose from a list of position titles.

The goal here was to only include answers that reflected what the managers were doing in practice and not include theoretical answers.

6) What IT capabilities are you looking for in mid-level candidates? This question collected the specific capabilities that managers looked for in mid-level candidates. As in the entry-level question, this question was only counted when the respondent indicated that they were in fact hiring.

5.3   Full-time Equivalent IT Employment Data

One clear result from the Phase 1 study of client organizations was that organizations in all size categories were increasing their use of outside FTEs (full-time equivalent employees). The following graph shows the overall numbers:
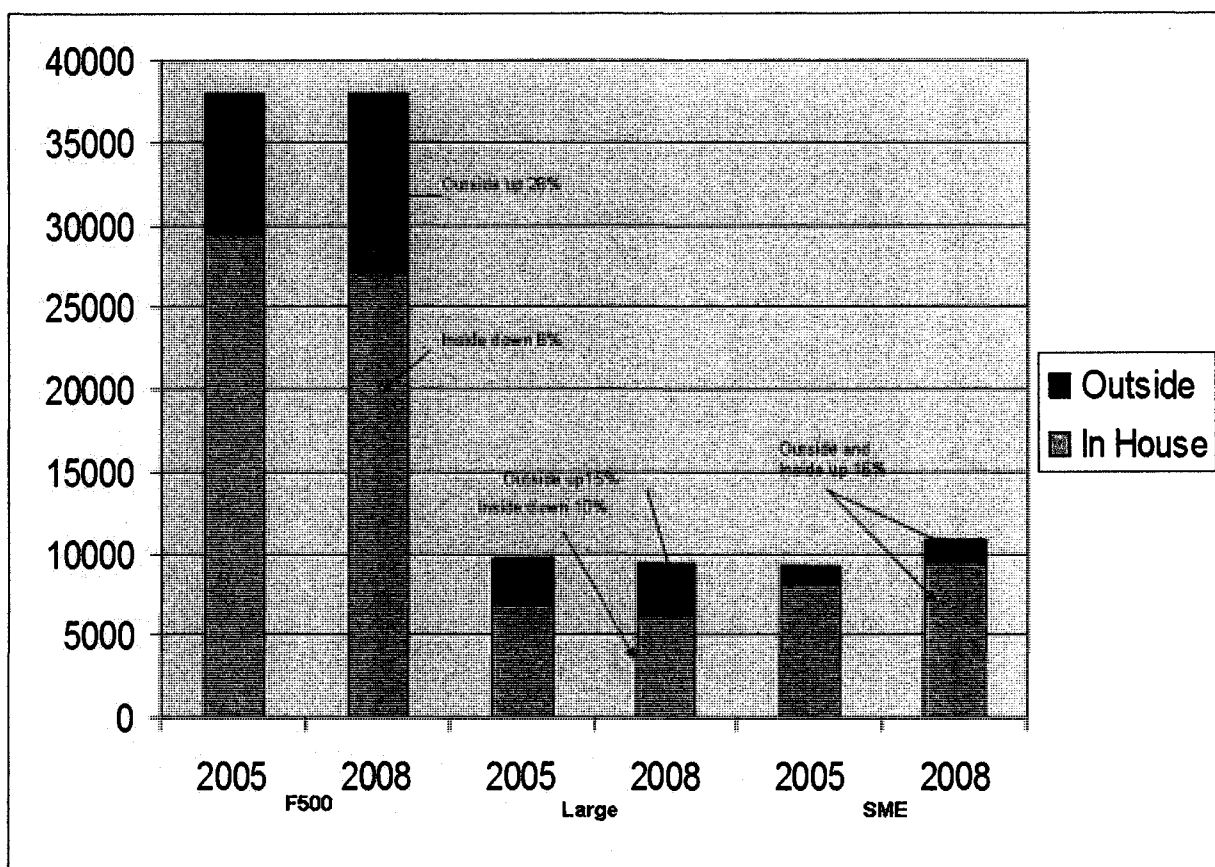
Figure 10: FTE (IT only) Distribution in Phase 1 Client Organizations

The Fortune 500 category managers estimated that in 2008, they would increase their use of outside providers by 28%. This was the largest increase in outside FTEs. This group estimated that their in-house FTEs would decrease by 8%. These managers indicated a small increase in overall FTEs.

The SMEs estimated that they would increase their use of outside providers by 16%, however, they were also increasing their in-house FTEs by 16% indicating an overall growth in these organizations.

The organizations in the Large group estimated a small decrease in overall FTEs while increasing outside FTEs by 15% and decreasing in-house FTEs by 10%.

The data shown here indicate that IT managers in all size organizations will be increasing the number of decisions they are making about what capabilities are acquired through outside providers. This result indicates the importance of a useful model for assisting in these decisions.

5.4   Critical Capabilities vs. Those That are Outsourced

5.4.1   Phase 1 – Client Organizations Current Critical Capabilities

Figure 11 shows the capabilities that client managers indicated were critical to maintain in house (the data was collected in 2005). These are the capabilities that client managers want to own in their organizations. The figure is focused on the top ten, however, since there are tied scores, it shows the top 13. The color coding helps to identify the categories of capabilities: Technical = orange, Project Management = green, Business Domain = blue and Outsourcing = purple.

It can be seen that there are only two technical capabilities that were deemed critical to maintain in house: systems analysis and systems design. The rest of the capabilities are all in either the project management or business domain categories. And, importantly, the two technical capabilities require face time with the clients of the technology. These two technical capabilities are different from some of the other, standardized technical capabilities in this regard; they are client-facing capabilities and they require business communication skills.
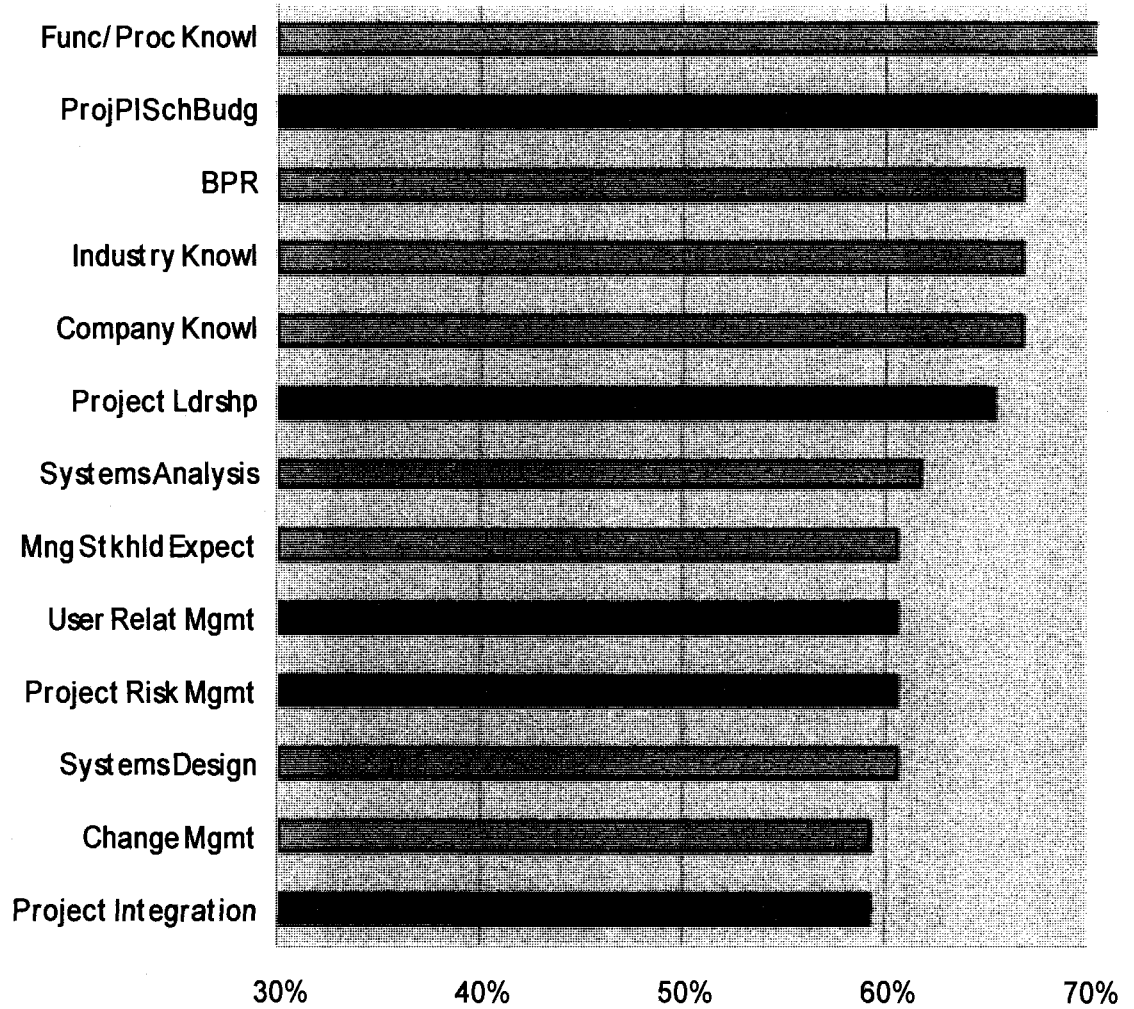
Figure 11: Client Critical Capabilities in 2005

In Figure 12 are shown the top 10 capabilities (12 shown dues to ties) that client

organizations responded would be outsourced in 2005. Every skill shown in

Figure 12 is from the technical skills category. It is interesting to note that

systems analysis and systems design show up here as well, indicating that some

of those skills and capabilities will also be obtained through outsourcing and they

will not be carried out exclusively in house.
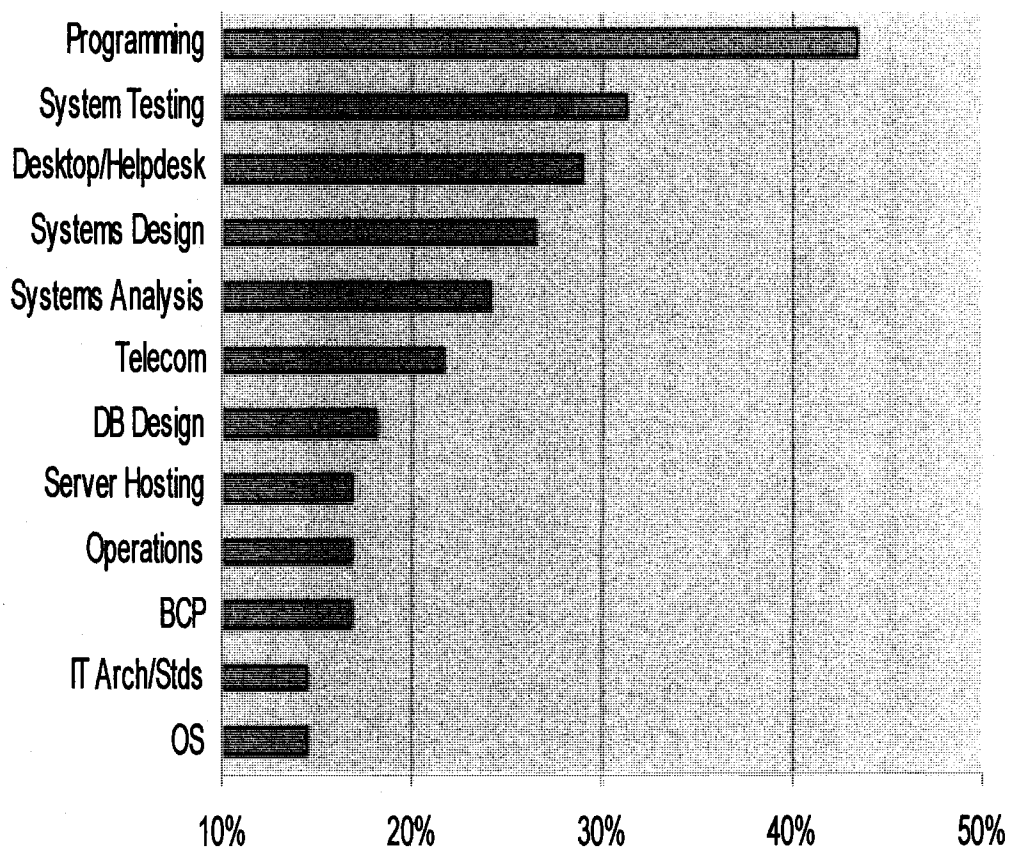
Figure 12: Client Capabilities Sourced in 2005

5.4.2. Phase 2 – Service Providers Current Critical Capabilities

The service provider organizations responses to the question of what capabilities are currently (data collected in 2006) critical to maintain in house are shown in Figure 13. This list has a lot in common with the results of the client organizations and this will be discussed in Section 6 Interpretation of the Results.
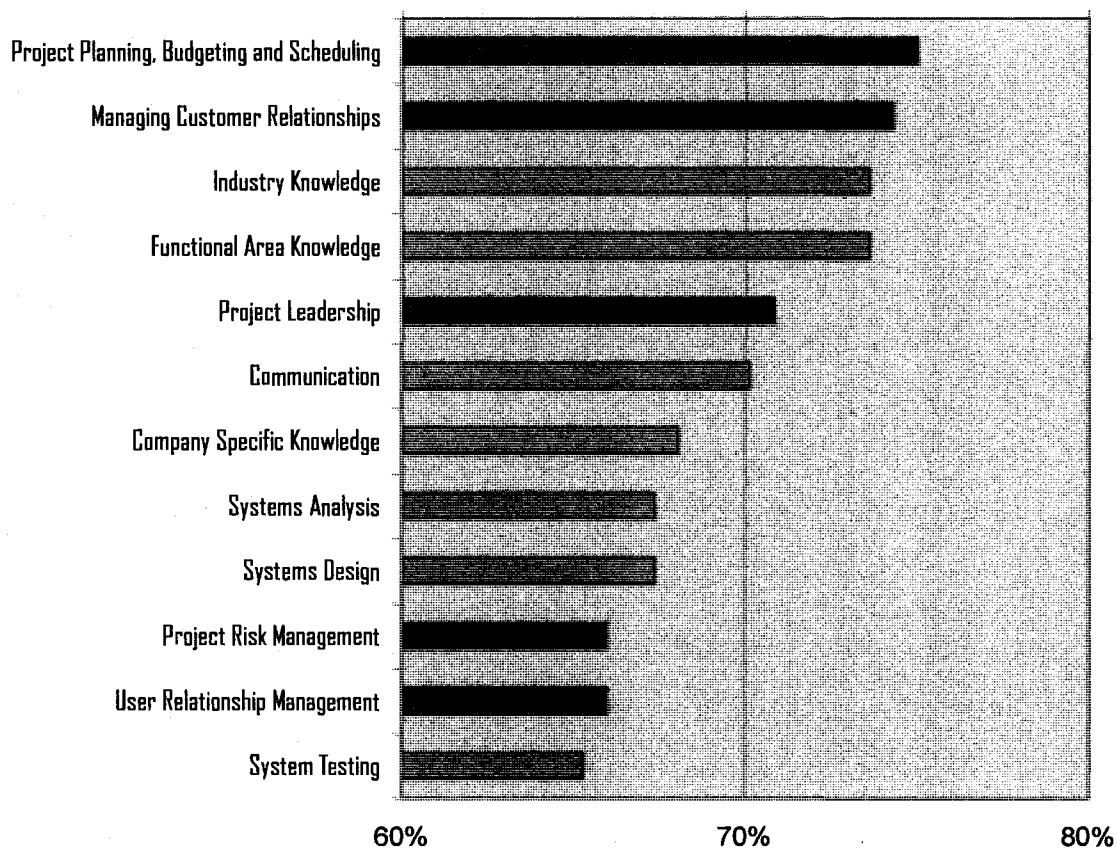
Figure 13: Critical Capabilities for Service Providers in 2006

The question about capabilities that would be outsourced was not asked directly

of the service provider organizations because the Phase 2 effort was focused on

understanding the other side of the skills questions, i.e., what skills service

providers would have to meet the need of their clients.

5.5 Capabilities that are Emerging in Importance Versus Those That are Declining

5.5.1 Phase 1 – Client Organizations Emerging and Declining Capabilities

The responses of the client organizations to the question of what skills would be emerging in importance over the next three years (by 2008) are shown below in priority order (for the top ten; thirteen shown because of ties):

- IT Governance
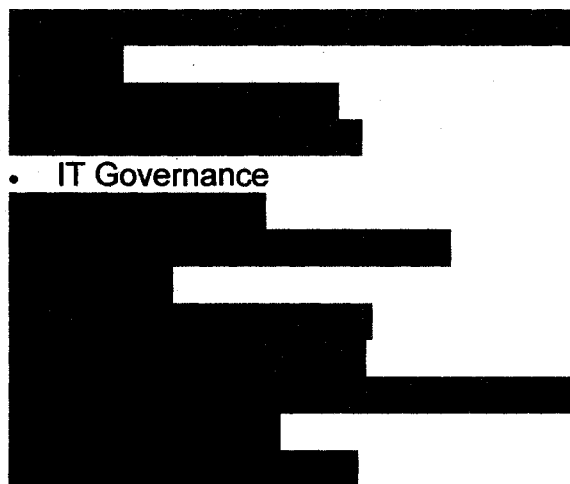
The blue highlighting indicates the capabilities that are in the Business Domain category and clearly, they represent the majority. The two highlighted in orange/red are Technical and the remaining three are two Outsourcing (purple) and one Administration.

The following list shows the capabilities (in priority order for the top ten; eleven shown because of ties) that were viewed by the client organizations as declining in importance (by 2008), which means that the managers were not seeking these skills to maintain in house:
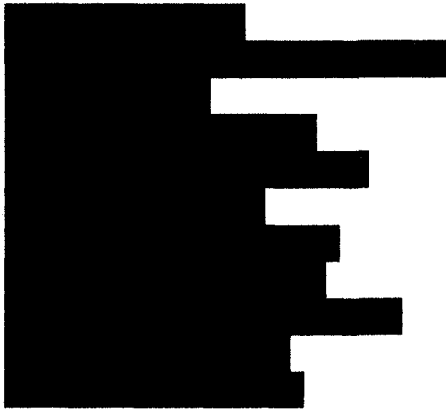
All of these capabilities are from the Technical category.

5.5.2. Phase 2 – Service Provider Organizations Emerging and Declining Capabilities

The following list shows the responses in priority order for the top ten (twelve shown because of ties) from service provider organizations of the capabilities that will be emerging in the next three years (by 2009) as critical:

The predominant number of capabilities (five) is in the Project Management category (highlighted in green). There are four Business Domain capabilities (blue), two Technical (orange/red) and one Outsourcing (purple). These emerging capabilities differ from those reported by client organizations and the comparison will be discussed in Section 6 Interpretation of the Results.

The top ten capabilities (in priority order) that will be declining by 2009 according to the service providers are:

There are eight Technical capabilities that are shown here which are in close agreement with the Technical capabilities that the client organizations indicated would be declining in criticality for keeping in house. There is one Project Management and one Outsourcing capability rounding out the ten.

5.6 Capabilities Sought at Entry and Mid Level Hiring

5.6.1. Phase 1 – Client Organizations Entry and Mid-Level Hiring

Figure 14 shows the responses to the question about desirable skills and capabilities in the entry-level positions that managers were seeking. Entry-level is defined as hiring new graduates of undergraduate programs. It is interesting to note that in this list of top ten (twelve because of ties) nine of the capabilities are in the Technical category. The other three are all Business Domain.
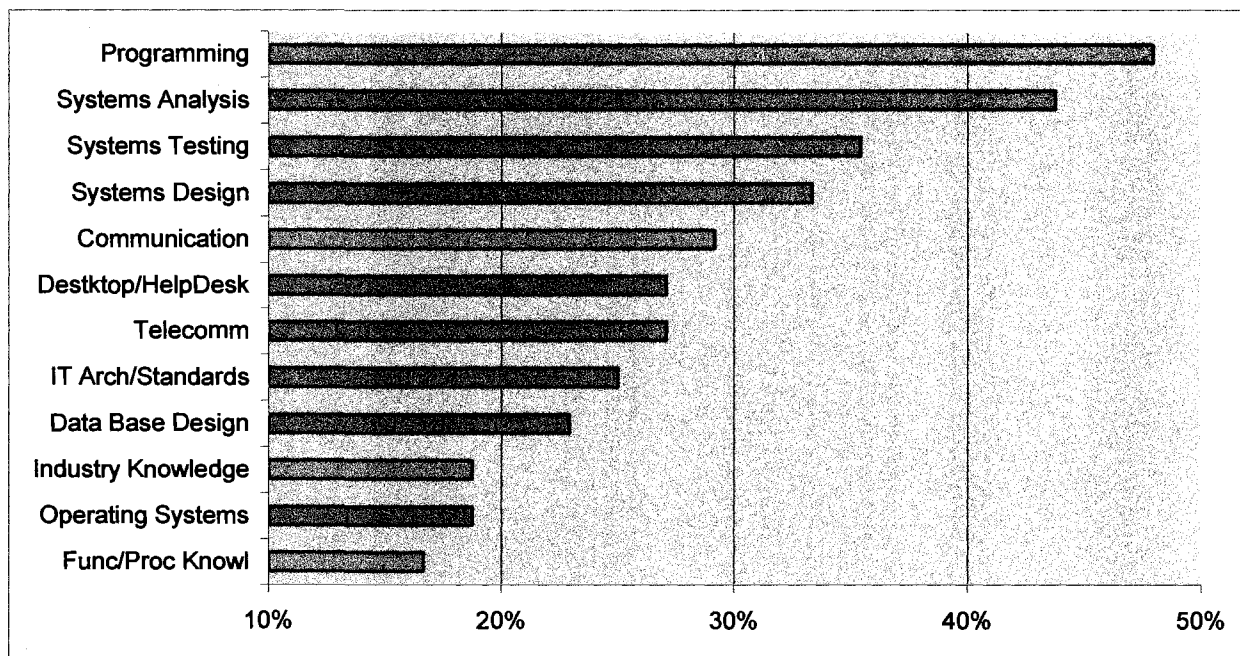
Figure 14: Client Organizations Entry-Level Hiring Capabilities Desired

The next figure, Figure 15, shows the results from the client organizations of what capabilities managers in these organizations were seeking at mid-level hiring (top ten, but thirteen shown because of ties). Mid-level hiring was defined as hiring individuals with at least five years of experience. Eight of the capabilities are in the Project Management category, three are Business Domain and two are Technical.
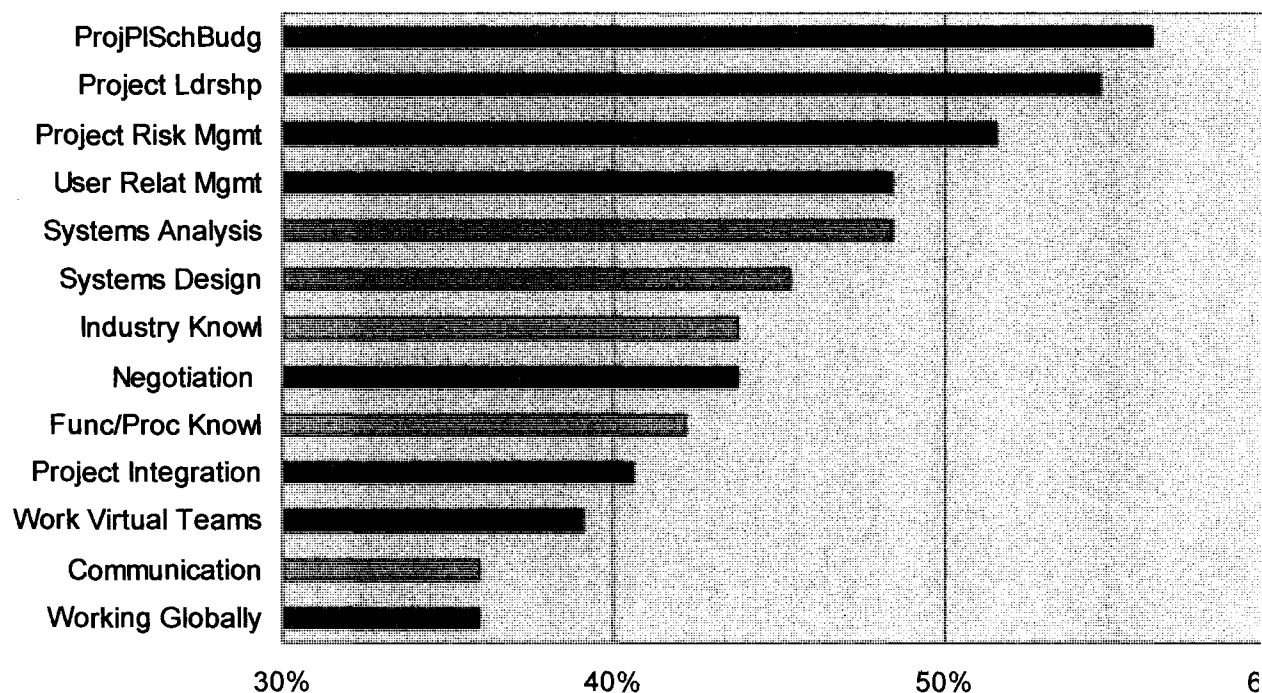
Figure 15: Client Organizations Mid-Level Hiring Capabilities Desired

5.6.2. Phase 2 – Service Provider Entry and Mid-Level Hiring

The top ten entry-level capabilities (twelve shown because of ties) in 2006 that
were specified by the managers in the SPs are shown in Figure 16. Four of the
capability categories are represented in the list: Technical, Business Domain,
Project Management and Outsourcing. A comparison between entry-level
capabilities for clients and SPs will be discussed in Section 6.
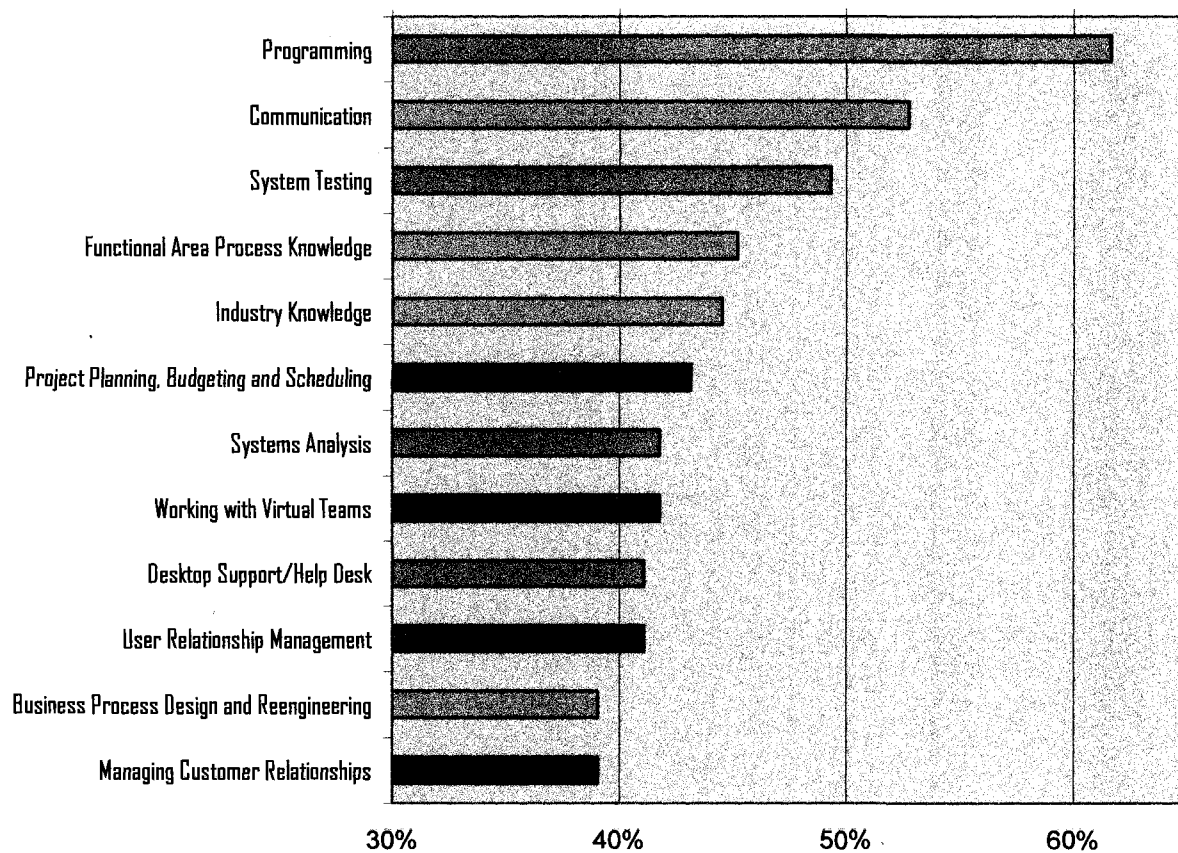
Figure 16: Entry-Level Capabilities in 2006 for Service Providers

Figure 17 shows the top ten capabilities (twelve are shown because of ties)

desired by SP managers in 2006 for mid-level hiring. Project Management and

Business Domain capabilities figure prominently in the list.
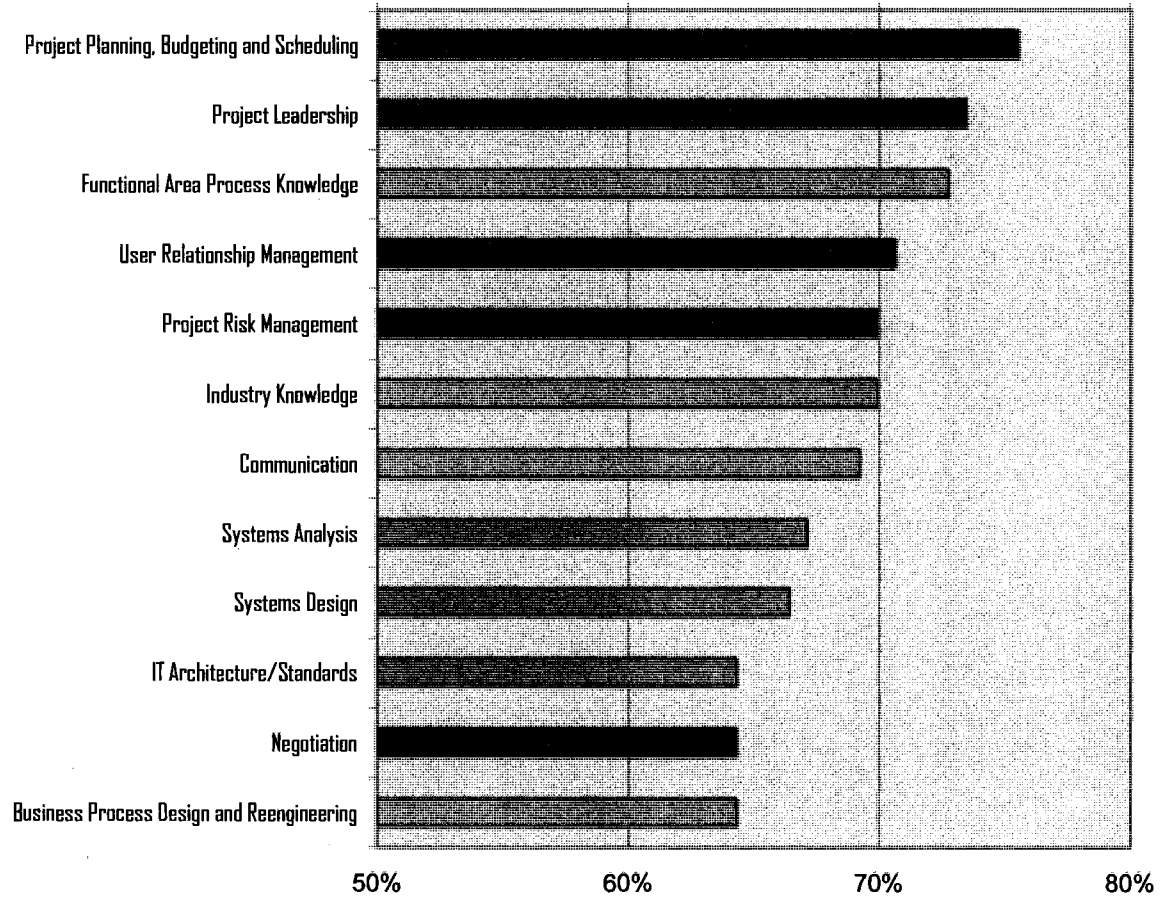
Figure 17: Service Provider Mid-Level Hiring Capabilities for 2006

5.7. Phase 1: Types of Services Outsourced and Why

In the Phase 1 research respondents were asked to indicate the types of services they were sending to outside providers. Figure 18 summarizes the type of service and the percentage of the sample indicating that service. Respondents chose more than one service; therefore the total percentage exceeds 100%

Types of Services Outsourced	% of Sample
Programming for systems development	61
Analysis for systems development	48
Help Desk/Desk Top Support &Training	48
Data Center/Network Operations	46
Systems Enhancements/Maintenance	43

Figure 18: Types of Services Outsourced by Clients Organizations (Phase 1)

The most frequently outsourced service was "Programming for systems development" at 61%. The other four services fell into the range of 43-48%

A follow-up question asked why these services were being outsourced rather than satisfied by hiring the necessary capabilities in house. Figure 19 summarizes the responses. Total percentage exceeds 100% as respondents could choose more than one reason.

Reason for Outsourcing	% of Sample
Provides capabilities as needed on a project-by-project basis	83
Provides flexible staffing needs	61
Can't develop or retain capabilities in house	25
Less expensive	15
Provides specialized capabilities	10

Figure 19: Reasons for Outsourcing (Phase 1)

The number one reason for outsourcing at 83% was "provides capabilities as needed on a project-by-project basis. In essence the most popular reason for outsourcing is to provide flexibility in the workforce rather than increasing staff and risking that the staff will be needed only in the short term. It is interesting to note that only 15% chose the economic reason, i.e., "less expensive." This is consistent with interviews with client companies where they clearly convey that while lowering costs is often the motivation for initiating outsourcing, the end result is not always less expensive, but that there are other values, e.g., flexibility, obtaining specialized skills, etc.

5.8. Entry and Mid-Level Positions with the Most Openings and Why Hiring for these positions

Part of the Phase 1 interview outline requested information about which positions at the entry and mid levels had the most openings. Figure 20 summarizes the results for the entry level positions, indicating that the position "Programmer" had the most openings for 34% of the respondents.

Entry-Level Position with Most openings	% of total
Programmer	34
Help Desk	21
Systems Analyst	16
Programmer/Analyst	10
Operations	7
Consultant	4
Network Administrator	3
Other	3

Figure 20: Entry-Level Position with Most Openings (2005)

The follow-up question asked was why the respondent was hiring for this position as opposed to acquiring the capability through outsourcing. Figure 21

summarizes the responses with the top response at 41% being: "Will need

positions in-house to groom critical skills for the future."

Why Hiring In House for these Entry-Level Positions	% of total
Will need positions in-house to groom critical skills for future	41
Critical Position to keep in house	28
Less expensive to hire than to outsource	24
Never considered outsourcing this position	7

Figure 21: Why are Client Organizations Hiring In House for these Entry-Level Positions

It is also interesting to note in Figure 21 that 24% of the respondents indicated it

was less expensive to hire for the needed position than to outsource for the

capability.

The analogous questions were asked for the mid-level positions, and Figure 22

summarizes the responses. The position in the first slot is "Project Manager" with

25% of the sample indicating this as the position with the most openings. Very

close behind is "Systems Analyst" with 24% of the respondents choosing this

area of capability.

Mid-Level Position with Most Openings	% of total
Project Manager	25
Systems Analyst	24
Programmer	11
Senior Systems Analyst	10
Development Manager	6
Network Engineer	6
Specialized Technology (.Net, Java, etc.)	6
System Architect	5
General Management (including consulting, SOX)	4
Senior Programmer	2
Data Modeler/DBA	1

Figure 22: Mid-Level Positions with Most Openings (2005)

The summary for the follow-up question of why the organization was hiring as opposed to outsourcing for the capability is summarized in Figure 23. The responses for mid-level are all in the same relative positions as they were in entry-level hiring, with 47% of the sample choosing "Will need positions in-house to groom critical skills for the future."

Why Hiring In House for these Mid-Level Positions	% of total
Will need positions in-house to groom critical skills for future	47
Critical Position to keep in house	40
Less expensive to hire than to outsource	22
Never considered outsourcing this position	3

Figure 23: Why are Client Organizations Hiring In House for these Mid-Level Positions

5.7. Summary

The results from the SIM-sponsored research, which will be used in this dissertation, have been shown. As stated previously, this research was not carried out to specifically test the proposed model. Rather, this research is related to the model and will be used to illustrate the logic of the model.

6. Interpretation of Results

6.1   ITWF Outsourcing Decision Model Support

Four research questions were developed based on the literature search and one

on the prescriptive model. Since the focus of this dissertation is on the

prescriptive model, this discussion will begin with the last research question,

number five, based on the prescriptive model.

The fifth research question was:

> *Research question 5: Does the ITWF Outsourcing Decision Model provide*
>
> *a practical tool for aiding management in making outsourcing decisions?*

The answer to this research question can be explored by using the data from the

survey to determine whether the parameters of the model will support the actual

decision making of practicing managers. This is done in the next 4 sections.

The ITWF Outsourcing Decision Model (Figure 2 and 24) describes the

parameters of the decision to develop a capability internally versus obtaining it

outside the firm. The model simplifies the decision by focusing on these key

parameters.

The ITWF Outsourcing Decision Model (Figure 2 and shown again below as Figure 24) was developed based on the observations from the survey data. It was not directly tested by the survey data, therefore the discussions that follow are interpretations of the data and how the data supports the model. In Section 7 there will be a discussion on how future research can test the concepts of the model directly. In Section 6.1.5, the use of the model with a case study will illustrate its effectiveness as a prescriptive model. The application of the model to the decisions which are recorded in the data will show that there is validity in the model logic.

Figure 1 the ITWF Outsourcing Decision Model is shown here again for reference purposes:
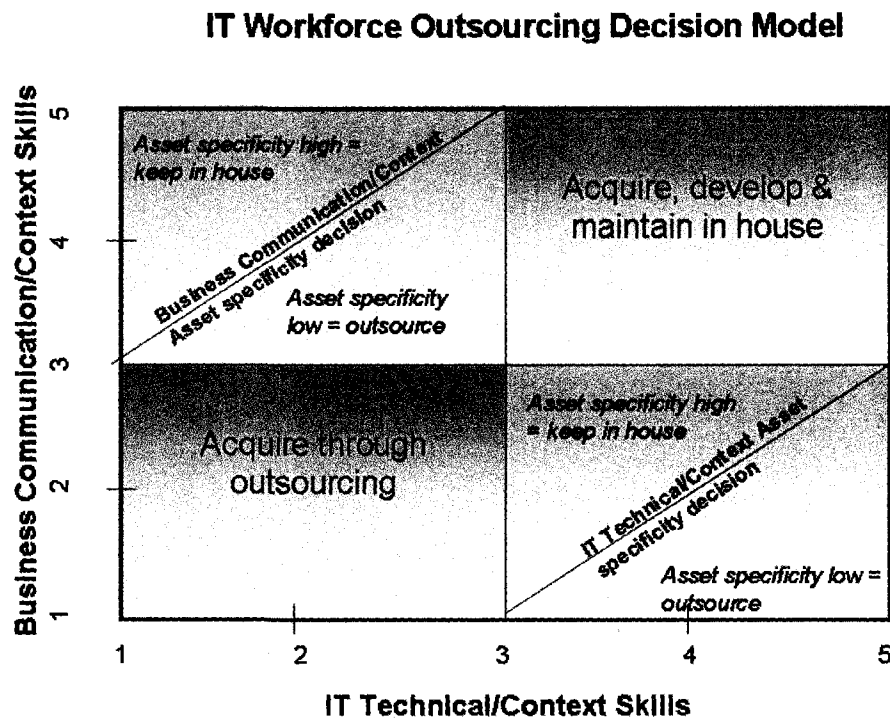
Figure 24: IT Workforce Outsourcing Decision Model

6.1.1 ITWF Outsourcing Decision Model – Acquire Through Outsourcing (Lower Left Quadrant)

Figure 12 (in Section 5) illustrates the top ten capabilities that client organizations reported they are outsourcing. The top two are programming (with over 40% of

the organizations) and systems testing (with over 30%). These two capabilities fall within the low to medium IT technical skills and require little to no business communication/context skills. The interviews with the respondents for the client organizations confirmed that they viewed these programming and system testing activities as commodities, i.e., they could be substituted with programming by different people without a loss of function or suitability. These are capabilities that are applied to work within the IT organization and do not involve communication with the user community. In the interviews, other programming functions that required a different level of business communication skills were not being outsourced.

According to the IT Workforce Outsourcing Decision Model, these capabilities may be acquired through outsourcing and the data from the survey and interviews supports this decision and therefore provides evidence in support of Hypothesis 1.

The data from Phase 2 shows that over 60% of the provider organizations are looking for standardized (commodity) programming skills in their new hires. This confirms the other side of the issue indicating that provider firms expect their clients to send them this form of programming work; therefore they need to have this programming capability in house. Here providers responded about

specialized or emerging technology programming skills that were sought, but discussed these as exceptions.

Client organizations also reported that programming was declining over the next three years as a capability that they would develop in house. This adds additional support to the model parameter that standardized IT technical skills will be outsourced.

An interesting result of the Phase 2 effort is that service providers are also indicating that programming will be declining over the next 3 years. One interpretation of this result is that the providers are planning to direct their business to higher levels of service, i.e., they are "moving up the food chain." Recent interviews with top managers of several of the Indian service providers have confirmed that this is their business strategy.[16] Another interpretation here is that the providers will begin outsourcing more of the standardized IT technical skills to other providers, i.e. subcontractors. This interpretation is supported by interviews with providers who have indicated that they will be outsourcing work to locations where the economic value of the labor arbitrage will help them keep their charges to clients at a reasonable level.[17]

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[16] Reports here from interviews on television and in print:

http://basman.wordpress.com/tag/strategies/

[17] Personal interviews with large U.S. and India-based service providers

The list of declining capabilities (top 10) reported by client organizations consists entirely of items from the Technical category (shown in Section 5.5.1). All of these are capabilities that have become standardized as understanding of how to carry them out has increased with maturity in the IT marketplace. The top two were discussed above, but after those come: operations, mainframe/legacy, voice/data telecomm, server hosting, continuity/recovery, operating systems, database design/management, systems testing and then one which merits more discussion in the next section, systems analysis. The low to medium rating or standardized nature (i.e., low asset specificity) and the low to medium business communication/context capability required (also low asset specificity) make it clear that an IT organization would want to achieve economic efficiency in these capabilities. That means not investing in the acquisition, development and maintenance of these capabilities in house.

6.1.2 ITWF Outsourcing Decision Model – Contingent Decision: Acquire Through Outsourcing When Business Communication/Context Skills Can be Found versus Keep in House when Difficult to Find (Upper Left Quadrant)

The third highest capability shown to be outsourced is "Help Desk/Support" (at just under 30% of the organizations). This is a particularly interesting capability

because it rates as low to medium on the IT technical/context scale – the process is carried out through scripting and with structured software support – however, it has an element of client facing which requires business communication/context skills. Many organizations have struggled with the decision as to whether this capability is developed in house or acquired through outsourcing. According to the ITWF Outsourcing Decision Model, this capability falls into the upper left quadrant where a contingent decision is required. The organization will need to evaluate the level of business communication/context skills and determine if these can be found within a service provider to satisfy the support requirement. Another way of describing this is that the organization will have to measure how high the asset specificity is in terms of the language that facilitates communication in the organization. There are numerous examples of organizations making this decision in different ways. Some have outsourced off shore, some have kept it in house and others have outsourced near shore to enable the appropriate level of support. The key point here is that this is not an easy decision and the model shows that clearly.

The parameters of the 1 to 5 scale indicating a level of commoditization vs uniqueness of the IT technical/context skills and the level of business communication/context skills required helps the decision maker to focus on what are key criteria for making the decision. When a capability is rated as low to medium in terms of IT technical skill, but is rated higher on the business

communication/context skills required, then the decision is not straightforward, but requires a careful evaluation of factors to determine the best solution for the individual organization. This is the "decision support" nature of the model: it does not impose a decision, but rather, supports the manager in considering the factors that should be examined in making the decision.

The parameter of business communication/context skills in the IT Workforce Outsourcing Decision Model serves as a simplified surrogate for measuring asset specificity in the areas business concepts and business language. The parameter of IT technical/context skills serves as a simplified surrogate for measuring asset specificity in the area of IT technology. As discussed earlier in this dissertation, researchers have found that asset specificity is an important measure of whether something is "core" and therefore can indicate whether something can be outsourced versus kept in house [Gomes & Joglekar, 2005, Lacity, 2002, and Poppo & Zenger, 1998]. However, determining asset specificity is not a task that most managers attempt. And tying asset specificity to transaction cost economics appears to complicate it to the point that this is just not done in practice. The surrogate parameters in the IT Workforce Outsourcing Decision Model can help managers get around this difficulty. These results provide evidence in support of hypothesis 3.

6.1.3 ITWF Outsourcing Decision Model – Contingent Decision: Acquire Through Outsourcing When Medium to High IT Skills Can Be Found Outside versus Keep In House When Difficult to Find (Lower Right Quadrant)

The list of critical emerging capabilities shown in Section 5.5.1 contains only two technical capabilities: "IT Architecture & Standards" and "Security." Interestingly, these same two technical skills are the only ones on the emerging list from service providers. Clients are indicating by this list that these are capabilities that they will want to develop and maintain in house. However, the providers are indicating by having them in their list that these are capabilities they want to develop and maintain as they see them as something clients will be requesting.

One interpretation is that the clients view these two technical areas as having high asset specificity and will want to have them tailored to their needs. The fact that they are on the list of critical emerging skills also indicates that they are not yet standardized. These two technical capabilities will fall into the lower right quadrant and pose another decision that must be carefully considered. These technical areas do not require specialized (medium to high) business communication/context because they are newly emerging and therefore have not been established inside the organization.

If providers are developing their expertise in these capabilities, then they may be able to supply the skills to the clients' satisfaction, but this will require investment

on the clients' parts to make the determination and consider the business

communication/context aspects. The final decision will be based on the clients'

assessment of the business communication/context potential of these capabilities.

This provides evidence in support of hypothesis 4.

6.1.4 ITWF Outsourcing Decision Model –Acquire, Develop and Maintain In House (Upper Right Quadrant)

The upper right quadrant, analogous to the lower left one, represents a more

straightforward decision process for acquiring capabilities. When business

communication/context skills and IT technical/context skills are both medium to

high, i.e., they both have high asset specificity, then the decision is to acquire,

develop and maintain the capabilities in house.

Figure 11 shows the capabilities reported by client organizations that the

managers considered critical to maintain in house. These include six in the

category of business domain:

- Functional Area Process Knowledge
- Business Process Redesign
- Industry Knowledge
- Company Knowledge
- Managing Stakeholder Expectations
- Change Management

These business domain capabilities require client-facing activities which make them medium to high on the business communication/context scale and therefore high in asset specificity for that parameter. These capabilities require the asset specificity in the following areas: the business language that facilitates communication within the organization, industry knowledge about how "things are done," company knowledge about how "things have been done," and user community knowledge. Some service providers are developing greater capability in these areas through long-term relationships with specific organizations and/or industries. For example, there are service providers who specialize in working with pharmaceutical companies because they have learned a great deal about that industry and built their resources to specialize in that industry. As service provider depth of capability increases, client firms will be making decisions about outsourcing capability that had previously been clearly capability to maintain in house. The growing capability within service providers in the business communication/context area reflects the nature of the outsourcing business as growing in maturity.

The IT technical skills of systems analysis and systems design are also medium to high in the need for knowledge of the history of systems in house as well as experience in working with them. At the time of the survey, the managers rated these capabilities as critical to keep in house. This is consistent with the model

parameters indicating that the medium to high rating of both business communications/context and IT technical/context skills would suggest keeping the capability in house.

Systems analysis and systems design are, at their core, technical capabilities; however, they require client-facing activities supported by communication skills to carry them out well. In the Phase 1 research results these two skills showed up as both critical and as skills that are being outsourced. This demonstrates the confusion when a capability is low to medium from a technical/context point of view (i.e., low asset specificity), but requires business communication/context skills (high asset specificity). The logical interpretation here is that the aspects of systems analysis and systems design that are standardized will be outsourced, while the client-facing aspects will remain in house supported by business communication/context capability. In this situation, the actual tasks can be split when the in-house client facing aspects are carried out and the products of that activity are passed on to the outsourced capability for the remainder of the tasks that are standardized.

Under the absorptive capacity discussion (ACAP), it was noted that one of the ACAP factors is the ability to facilitate knowledge exchange between partners. This example of dividing the systems analysis and systems design capabilities

between in-house and outsourced resources is an example of where that ability is very important.

Under the resource-based view discussion, it was noted that resources have been placed into three broad categories [Day 1994]: 1) inside-out (capabilities deployed from within the firm, e.g., technology skills), 2) outside-in (externally-oriented capabilities that anticipate markets, competitors, and development, e.g., applying new technologies within the firm) and 3) spanning (capabilities that involve both internal and external analysis, e.g., managing IT outsourcing relationships). The ability for the in-house systems analysis and systems design resources (with the business communication/context skills) to manage their relationship with the outsourced resources (with the standardized IT technical/context skills) is a good example of personnel who are spanning resources.

Five of the capabilities in Figure 8 are in the category of project management

- Project planning, budgeting and scheduling
- Project leadership
- User relationship management
- Project risk management
- Project integration

The same arguments can be made here as for the business domain capabilities: the client organization managers judged these as critical to keep in house, consistent with the model parameters of specialized capability in both business communications and IT technical skills.

Figure 13 lists the capabilities reported by service provider organizations that the managers considered critical to maintain in house. Four of the top capabilities are in the business domain category:

- Industry knowledge

- Functional area process knowledge

- Communication

- Company knowledge

All of these except communication are identical to those reported by client organizations. This indicates that the service providers recognize the importance of building these medium to high rated capabilities, i.e., they are increasing capabilities that improve their ability to move into areas with asset specificity.

Four of the capabilities fall into the project management category:

- Project planning, budgeting and scheduling

- Project leadership

- Project risk management

- User relationship management

All of these are also in the client organization list. Again, the interpretation is that

service providers are moving into high to medium business

communication/context capabilities as they work with clients for longer terms and

they are developing medium to high IT technical/context skills as they mature

and "move up the food chain" in their work with clients. These results provide

evidence in support of Hypothesis 2.

6.1.5 Illustration of the ITWF Model with a case study

The author became familiar with outsourcing decisions being undertaken by a

Fortune 500 consumer product firm in 2005. After three years the experience of

the decisions has been reviewed and provides an interesting case study to

investigate by using the ITWF Outsourcing Decision Model.

The outsourcing decisions were brought about by three key business factors:

- The business was undergoing a major restructuring due to the divestiture

    of a large portion of the business;

- The existing IT technology that supported the entire firm was considered

    antiquated and in need of major redesign;

- The strategic alignment between the business and IT was judged to be very poor by both the line management and the IT management.

It should be noted that these are significant business factors and are unusual in the business community at large. The original business foundations of this firm date to the 1840's, and while, there was no information technology at that time, there is a history of IT in the firm continuing to function without major redesign. "Our company comes out of a long history of doing it themselves, but today's trends are difficult to ignore and protectionist policies generally don't work," commented the Director of IT for one of the major business lines. He added, "Outsourcing is no longer seen as a threat to the U.S. economy, but rather as an opportunity for innovation and renewal." Thus it was clear that IT management was approaching the decisions regarding outsourcing with a positive viewpoint about what outsourcing might provide and looking toward overall value and not solely labor-arbitrage-based cost savings.

In addition, managers commented that they could see that the IT professional pipeline within the U.S. was thinning due to baby-boomer retirement in the years 2008-2011 and the lower enrollments in computer science and IT–related programs in academic institutions. The Director of IT added, "India is graduating about 75,000 IT professionals annually, while the U.S. is graduating 26,000. China is graduating 600,000 engineers annually, versus 70,000 in the U.S. And

in the U.S., enrollments in IT-related subjects are falling 40% per year in many institutions."[18]

The first step in the process was to determine which functions within IT would be candidates for outsourcing and which would remain in house. The discussions centered on determining "core" versus "non-core" functions. According to the VP for Governance, this distinction led to debates among IT management and line management, some of which were "heated" and "major arguments and were very difficult to resolve."

The following figure shows what predictions would have been made using the ITWF Outsourcing Decision Model. These predictions are based on the author's understanding of the activities and, in effect, what the author would have recommended to the organization, based on the use of the model.

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[18] This comment was made in March, 2007. Since then, enrollments in IT-related programs in the U.S. have leveled off and begun to rise slowly.

IT Workforce Outsourcing Decision Model
Case Study: F500 Consumer Product Company
Model Predictions
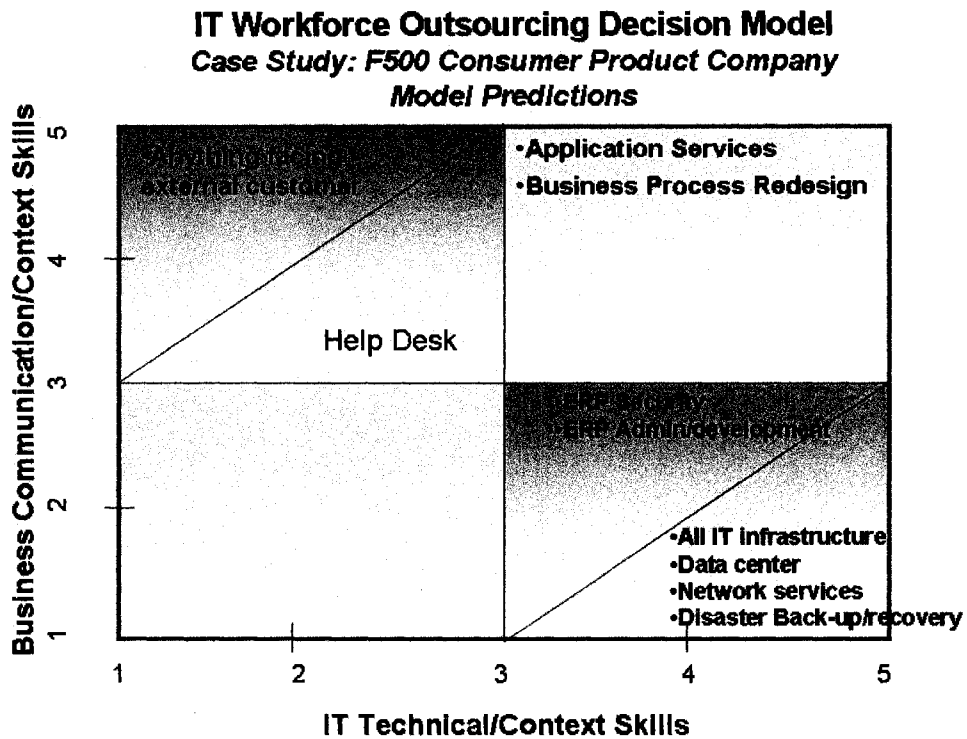
Figure 25 ITWF Model Case Predictions

The functions shown in the upper right quadrant, "helpAcquire, develop and maintain in house" are application services and business process redesign. These functions are placed here because they require a medium to high level of business communication/context capability and medium to high IT technical/context skill in order to be carried out effectively for the firm. They require understanding the language of the firm and understanding the development context of the technology in place.

The upper left quadrant is one where a contingency decision is required and the deciding factor is based primarily on the business communication/context capability. The function "Anything facing external customer" requires a very high level of business communication/context skill and may require a range of IT technical/context skills depending on the specific systems involved. The managers should consider this carefully as part of making the decision to outsource or maintain in house.

The other function shown in the upper left is "Help Desk" and in this instance, it is an internal help desk function. Help desk requires a medium level of business communication/context skill as calls are received from managers throughout the organization, many of whom have a limited understanding of the technology they are using. The IT technical/context skill level is low to medium because there is software in place to assist the help desk personnel in troubleshooting calls received. This is another decision, where management will weigh the value of the business communication/context need to decide whether to keep Help desk inside the organization versus the value of outsourcing and using the commodity skills available in the marketplace.

The lower right quadrant is also one where a contingent decision is required, but here the deciding factor is the IT technical/context capability. ERP security and ERP administration and management are areas where the business

communication/context skills is approaching medium because of the interaction with line management that takes place in the area of process redesign that is part of implementing an ERP system. However, the IT technical/context skill is high because of the specialized knowledge required along with an understanding of the business processes within the firm. However, it is important to note for this decision, that the organization did not currently have the ERP expertise in house and would need to either staff this function from scratch or outsource it. These factors together put this into the contingency decision area and demand a well-considered decision on the part of management.

The remaining functions in the lower right quadrant all require medium to high levels of IT technical/context capability along with low levels of business communication/context skill. The organization stated clearly that they intended a major upgrade in these areas from that which existed in house and that the skills to do this were missing as well. The decisions about these areas are likely to be based on the total value that the firm can obtain from outsourcing.

The business factors added to the environmental concerns led the firm to a decision to outsource their IT infrastructure, network services, disaster back-up and recovery, and ERP administration and management. They kept in house application services, business process redesign, help desk, and security processes for user certification. These decisions were made in 2005.

The following figure shows the ITWF Outsourcing Decision Model with the

decisions of this firm illustrated on the model. To reiterate, the firm never saw the

model and it is being used here by the author to illustrate the case study.

IT Workforce Outsourcing Decision Model
Case Study: F500 Consumer Product Company
Initial decisions - 2005
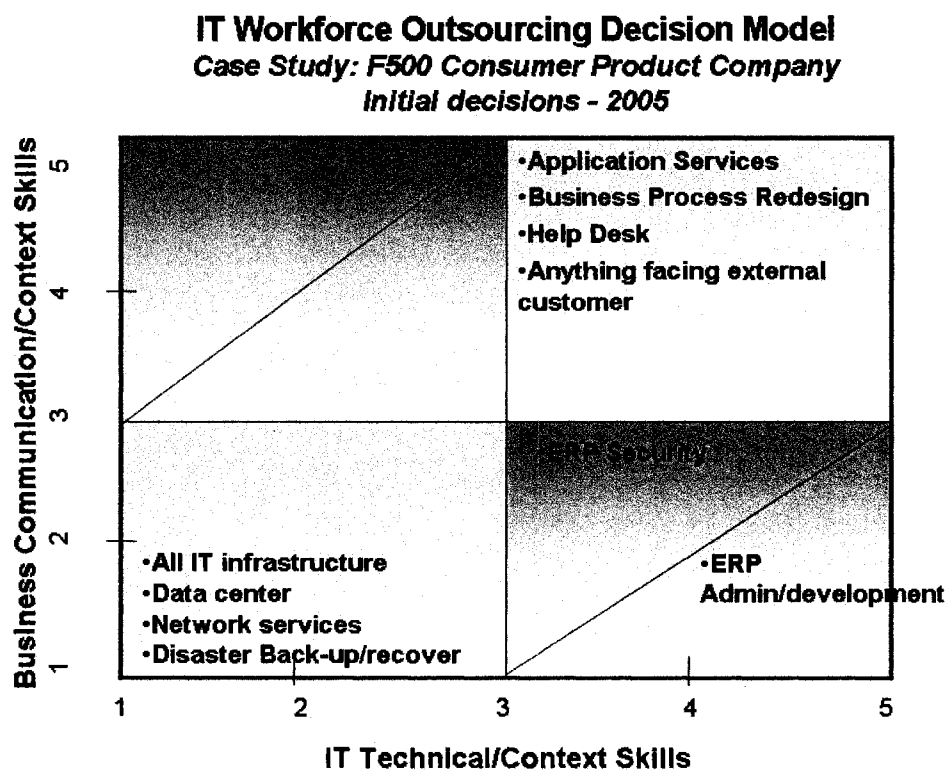
Figure 26 F500 Initial Decisions 2005

The Director of IT commented in a meeting in 2007 that an additional factor

entered into the final decisions in 2005: the sale of the building in which the data

center had resided, and this resulted in the requirement to find a new data center

facility, "Finding a new data center facility in anticipation of the sale of the

building was added to the complexity of the corporate restructuring plans to divest a portion of the business."

In his words, "The solution was to outsource core-IT infrastructure services (data center operation, network services) and non-core application services (physical database administration, etc.) to a third-party." It is interesting to note that even after the many discussions that management engaged in on the topic of core versus non-core the decision included outsourcing areas that were labeled as "core" by the Director of IT.

The management decided to use outsourcing to obtain the skills and capabilities that they wanted to update within the organization along with those that they wanted to rebuild for the divested company. They judged that outsourcing these areas would give them the commodity level skills that would satisfy their needs. They also chose an outsourcing provider with which they had a history of positive engagements.

These areas are all shown in the lower right quadrant indicating that their business communication/context requirement was low to medium and the IT technical/ context requirement was also low to medium. It is important to bear in mind that low to medium on the x-axis does not indicate that the technical skill was trivial, but rather that it was commoditized to the point where the requisite

skills could be obtained in the outsourcing marketplace. Also the "context" portion of the scale was judged low enough, that is, there was little importance given to understanding the context of these technical areas within the existing infrastructure design.

All areas that were kept in house had high levels of business communication/context skill requirements in their judgment. The clear decisions are shown I the upper right quadrant.

The "ERP Security" function is shown in the lower right contingent decision quadrant as it represents an area that could have been outsourced, but was kept in house because of its position on the vertical scale. The "ERP Admin/development" area is in the lower right hand corner indicating that the organization made the judgment that the business communication/context skill rating was less critical in making the contingent decision than the IT technical/context skills. And since the organization did not already have those skills in house, they chose to obtain them through outsourcing. However, in this case, the context aspect of the development of the ERP was high and, while outsourced, was set up with a well-defined governance mechanism to ensure that the outsourcing lead worked closely with the in-house project lead.

In 2008, the author had the opportunity to review the decisions that had been

made by the organization with the IT Director of Governance. The previous

Director of IT had since retired from the firm. The outsourcing decision had been

judged three years later as one whose outcome was still unclear. It had not been

as easy as they had anticipated. This ease had been based on the depth of

experience of the provider added to the fact that there had been a history of

working together. However, the IT Director had predicted in 2005, "We're

expecting it will take 2 years to achieve a governance model in this outsourcing

relationship."

Rather than finding that the "non-core" areas that had been outsourced could be

independently handled by the provider, the firm found that a great deal of time

and effort on their part was still required. To put this in terms of the model, there

was still a need for the IT technical/context skill to be at the higher end of the

scale. The context played an important role in being able to provide the services

that had been labeled "non-core." This result would have been predicted by the

model, where these areas were show in the "before" figure (figure 25) in the

lower right, contingent decision quadrant.

The ERP decisions for both security and admin/development appeared to be

working and, as previously noted, there was a clear governance mechanism

under which the outsourced portion was operating. The decision to keep the ERP security activity in house was in place.

Interestingly the help desk function, which had been initially kept in house, had been by 2008 outsourced. The firm worked with the provider over the three-year period to increase the provider's rating on the business communication/context scale and brought them to a point where the firm had confidence in the provider to effectively handle this area. In the "before" figure 25, help desk had been placed in the upper left contingent decision quadrant to focus on this specific issue: base the decision on the management judgment of the business communication/context scale.

The following figure summarizes the view in 2008:

IT Workforce Outsourcing Decision Model
Case Study: F500 Consumer Product Company
2008 Update

Business Communication/Context Skills (y-axis, 1–5)

Upper right:
•Application Services
•Business Process Redesign
•Anything facing external customer

•Help Desk

•ERP Security

•All IT infrastructure
•Data center
•Network services
•Disaster Back-up/recovery

IT Technical/Context Skills (x-axis, 1–5)

Figure 27: F500 Outsourcing Decision Update 2008

Help desk has been moved to the upper left quadrant indicating that while still requiring a medium to high level of business communication/context, it has been outsourced. All of the areas initially in the upper right quadrant remain in that position. All of the areas initially outsourced, but predicted to be contingent decisions are moved along the x-axis closer to the predicted location. The "ERP Security" function has been moved wholly into the top right quadrant indicating its continuing in-house skill requirement. The "ERP Admin/development" function remains in the lower right quadrant, but has been moved higher on the y-axis to

reflect the growth in business communication/context through the governance mechanism.

Comparing the predictions of the model with the update three years later, it can be seen that some of the precautions indicated by the pre-model have had an influence on the engagement. It is also evident that the core versus non-core discussions provided very little help in making the decisions regarding skills and capabilities that should be developed in house versus those that can be obtained through outsourcing.

The author asked the Director of IT Governance (in 2008), "Setting aside the core/non-core debates, would you characterize the decisions that were made as based on comparing the business communication/context knowledge with the IT technical/context knowledge?" He replied, "That is a very good way of putting it. Yes definitely! And, in fact, that view might have helped us improve the decisions or at least anticipate the problems that we had."

A further example from this organization involves the decision to outsource their payroll and benefits administration. This decision was also made in 2005 along with all the others; however, it was outsourced to a different provider – one that specializes in this specific application area.

The decision to outsource was based on the expertise of the provider and the belief – not verified – that the provider could handle any level of complexity in the application. If this application were to be placed on the model, it would reside in the upper left quadrant because, while the IT technical/context skill would be low to medium (especially given the experience of the providers who specialize in this application area – thus highly commoditized), there may be specialized, tailored aspects related to the business context that would rate it medium to high on the y-axis.

The result of the decision to outsource was as described by the Director of IT, "10 months of work by the provider during which the payroll function was hugely disrupted; followed by creating an in-house business warehouse solution to bridge major gaps in the provider's ability to implement the functions." The issue that was at the core of the problem was that some of the highest level executives of the firm had complex, individually-tailored compensation packages. The provider was expert at doing compensation packages THEIR way – standardized and commoditized.

Three years later, the firm still maintains a dedicated in-house team to monitor the provider to ensure that the payroll/benefits administration is operating effectively.

6.1.6 Summary of the ITWF Outsourcing Decision Model discussion

The results of the two phases of data collection were reviewed and compared with the decisions that the parameters of the ITWF Outsourcing Decision Model would suggest and were found to be consistent in all four quadrants. The data collection effort can be interpreted to support the logic of the model. In addition a case study was presented to illustrate how the model can be used in practice.

6.2 Discussion of Hypotheses: Is the ITWF Outsourcing Decision Model a Practical Tool for Decision Making?

The hypotheses that will be discussed are propositions arising from the ITWF Outsourcing Decision Model and research question number 5. The hypotheses are being used to examine the validity of the conceptual model.

The four hypotheses posed previously are:

Hypothesis 1: IT skills are obtained through outsourcing when the business communication/context skill is low to medium and the IT technical/context skill is low to medium.

Hypothesis 2: IT skills are acquired, developed and maintained in house when the business communication/context skill is medium to high and the IT technical/context skill is medium to high.

Hypothesis 3: The skill outsourcing decision involves a trade-off when the need for business communication/context skills is medium to high and the need for technical/context skills is low to medium.

Hypothesis 4: The skill outsourcing decision involves a tradeoff when the need for business communication/context skills is low to medium and the need for technical/context skills is medium to high.

Each one will be discussed with respect to the ITWF Outsourcing Decision Model and the data collected in the SIM-sponsored research.

6.2.1. Hypothesis 1: IT skills are obtained through outsourcing when the business communication/context skill is low to medium and the IT technical/context skill is low to medium.

This hypothesis is related to the lower left quadrant of the model where the need is for low to medium business communication/context skills and there is a need for low to medium (commoditized) technical/context skills. This combination

implies that the skills required to perform the task are plentiful and can be hired in-house or outsourced to a service provider. It is important to recognize that the low to medium scale for technical/context skills is not a judgment of the complexity of the technical skills, but rather of their commodity nature, i.e., are they substitutable. This quadrant is labeled "acquire through outsourcing."

The data from the SIM-sponsored research project support this hypothesis: The top ten skills shown (twelve due to tied positions) as most often outsourced by client organizations were all technical skills, with programming listed as the number one outsourced skill in 2005 (see Figure 12). All but two of these skills can be classified as commoditized requiring very little in the area of business communication/context skills.

In addition, in answer to the question of capabilities that would be declining in importance by 2008, i.e., capabilities that the client organizations would not be hiring, the list consisted of eleven technical skills (see Section 5.5.1). Only the last of these skills, systems analysis, requires business communications/context skills.

Therefore the data collected support the logic of the ITWF Outsourcing Decision Model which states that if the capabilities are standardized for both technical

skills and business communication skills then they can be acquired through outsourcing.

6.2.2. Hypothesis 2: IT skills are acquired, developed and maintained in house when the business communication/context skill is medium to high and the IT technical/context skill is medium to high.

This hypothesis is related to the upper right hand quadrant of the ITWF Outsourcing Decision Model where there is a need for specialized business communication skills and there is a need for specialized IT technical skills. This quadrant is labeled "acquire, develop and maintain in house."

The data from the SIM-sponsored research show that the list of capabilities that client organizations wanted to keep in house in 2005 had only two technical skills listed among the top ten (twelve due to tied positions) while there were ten capabilities that require higher levels of business communication skills such as (see Figure 11):

- Functional process knowledge (first)
- Business process redesign knowledge (third)
- Industry knowledge (fourth)
- Company knowledge (fifth)

There were also two technical capabilities that require specialized skills:

- Systems Analysis (seventh)

- Systems Design (tenth)

The Phase 2 results from service providers are consistent with the client organizations where nine of the top ten (twelve dues to ties) capabilities that they want to keep in house in 2006 (see Figure 13), require medium to high business communications/context, including:

- Industry knowledge (third)

- Functional area knowledge (third)

- Company-specific knowledge (sixth)

There were also the same two technical capabilities ("Systems Analysis" and "Systems Design") that require medium to high technical/context skills.

The data collected in both phases support the logic of the ITWF Outsourcing Decision Model which states that if capabilities are medium to high in both business communications/context skills and IT technical/context skills, then the capability should be acquired, developed and maintained in house.

6.2.3. Hypothesis 3: The skill outsourcing decision involves a trade-off when the need for business communication/context skills is medium to high and the need for technical/context skills is low to medium.

This hypothesis is related to the upper left quadrant which is one of the "trade-off" quadrants: if the capability is medium to high for business communications/context skills and low to medium for IT technical/context skills, then it requires a careful decision evaluating the tradeoffs related to the business communications/context aspect. Prior research has advocated making this kind of a decision based on asset specificity. In this research, the argument is made that practicing managers do not employ techniques of asset specificity in making such a decision, and therefore the ITWF Outsourcing Decision Model is a better tool for their use.

The SIM-sponsored data cannot be used to directly illustrate this quadrant as the data did not address tradeoff decisions that managers make. However, in Phase 1 there were some questions related to why capabilities were being outsourced that can be related to this quadrant. Figure 18 shows the summary of the types of services and the percentage of the sample organizations who said they were outsourcing the services.

Since each respondent could choose more than one type of service, the percentages are greater than 100%. Looking at these services is useful because

the list indicates the results of IT managers' tradeoff decisions. This list represents the bundles of capabilities that managers decided to obtain through outsourcing.

In the sample, 61% of the managers chose to outsource programming for systems development indicating that these capabilities can be provided with standardized business communication skills and standardized IT technical skills, i.e., programming capability was judged by more than half of the managers to fall into the lower left hand quadrant of the model. As stated previously, interviews with the respondents indicated that the programming capability that was being outsourced was in the area of commoditized skills.

Systems analysis was outsourced by 48% of the managers. The set of capabilities for analysis logically falls into the upper left quadrant where there are standardized IT technical skills, but there may be a need for specialized business communication skills. Since less than half of the managers chose to outsource these skills, this can be interpreted that the need for medium to high business communication/context skills can sometimes be an outsourcing issue and other times is not. 51% chose not to outsource these skills indicating that these were instances where there was a need for medium to high business communication/context skills.

Analogous arguments can be made for interpreting the other results as tradeoff

decisions.

In another question the sample was asked what entry-level positions that were to

be filled in the current year (2005) had the most openings, and a follow up

question on why the positions were being filled in-house as opposed to through

outsourcing. The results of these two questions highlight the tradeoff decisions.

Figure 20 shows the entry-level positions that had the most openings in house.

The top position was "programmer" with 34% of the sample choosing this

position. The follow-up question asking why these positions were being hired in

house as opposed to obtained through outsourcing is summarized in Figure 21.

In the sample, 41% of the respondents indicated that the positions in Figure 21

were being hired in house because people with these skills are needed to groom

critical skills for the future. It is interesting that the entry-level position with the

most openings (34%) was also the capability that was outsourced the most. The

best explanation for these results comes from the interviews. Most of the top IT

managers interviewed (many of whom had been in their careers 15-20 years)

held that fundamental skills acquired in learning programming are critical in

anyone they were hiring for in-house positions. Therefore the skill "programming"

is well regarded, even though it is often obtained through outsourcing. The desire

to have business communication/context skills in entry-level hires (rated as number five in the top ten) can be seen to agree with these results to indicate that IT management wants both IT technical skills and business communication/context skills for the employees they plan to develop in house. Therefore, these are the capabilities that will be needed in making the tradeoff decisions in the upper left hand quadrant of the model.

6.2.4. Hypothesis 4: The skill outsourcing decision involves a tradeoff when the need for business communication/context skills is low to medium and the need for IT technical/context skills is medium to high.

This hypothesis is related to the lower right hand quadrant and is the other "trade-off" quadrant: if the capability is low to medium for business communication/context skills and medium to high for IT technical/context skills, then it is one which requires a careful decision evaluating the tradeoffs related to the IT technical aspect. The asset specificity question here relates to the IT technical/context skills: if these skills are difficult to obtain through outsourcing, then they should be developed in house. The business communication/context skills are low to medium and therefore less of an issue in the tradeoff.

Here too, the SIM-sponsored research did not directly address the trade-off decision and therefore cannot be used to directly illustrate this quadrant. However, in Phase 1 the questions looking at what mid-level positions were to be

filled in the current year (2005) and had the most openings, and the follow up question on why the positions were being filled in-house as opposed to through outsourcing, are informative.

The top two positions with the most openings are Project Manager and Systems Analyst. These are both positions that require medium to high IT technical/context skills but, depending on the nature of the work, may or may not require medium to high business communication/context skills. For example, if an organization is planning to outsource for commoditized IT technical skills such as programming, then that organization will need to have project management skills in house to manage the outsourced work. In this case, the business communication/context skills will be low to medium because the project management work will be between the IT organization and the service provider (as opposed to with in-house customers).

The follow-up question asking why these positions were being hired in house as opposed to obtained through outsourcing is summarized in Figure 21. The results showing that 47% responded that these positions involved grooming critical skills for the future logically support the scenario. As the mission of in-house IT organizations evolves toward the managing of the delivery of solutions, the in-house need for project management capability increases.

6.3 IT Outsourcing in Practice

The results presented in Section 5 highlight the magnitude of decisions that are being made on a continuing basis by managers in both client and provider organizations. The individuals that make up the IT workforce in organizations are a key resource for those organizations. As discussed in the literature survey, the resource-based view (RBV) of the organization argues that decisions about resources are an important aspect of the strategic management of the organization. Therefore decisions about whether the capabilities of the human resource are developed internally or obtained through outsourcing become part of the strategic management of the information technology function and contribute to the strategic positioning of the firm. This section will discuss the first four research questions, all of which came out of the literature search.

6.3.1 Research Question Number 1: Will improved outsourcing decisions have a positive impact on the organization as a whole?

The first research question identified was:

> Research question 1: If management has a focus on IT workforce strategy, can it improve the decision making practices of what to outsource and will this substantially improve the impact of outsourcing on the organization as a whole?

RBV supports the concept that improved decision making regarding the IT workforce will have an impact on the strategic management of the firm. Improvement in the management of the human resource will have direct impacts on the firm's performance:

- When the decision is made to outsource capability appropriately, there will be a positive economic impact on the firm.

- When the decision is made to keep capability in house appropriately, there will be a positive impact on the development of absorptive capacity which will strengthen the human resource.

This first research question cannot be answered with the current research as it requires a longitudinal study that will match decisions about capability outsourcing with measures of firm performance. The SIM-sponsored research effort will be continued by repeating each phase over the next few years. This will provide an opportunity to collect data that will answer the first research question.

Even though, this research question is not answered in this dissertation, it is important to raise it in the context of whether outsourcing human resources has a positive or negative impact on firm performance. The arguments of the resource-based view indicate that the distribution of the resource "human resources" does have an effect on firm performance. Therefore, the proposed longitudinal study

may very well support the strategic nature of the proposed decision-making model.

6.3.2 Research Question Number Two: What Skills and Capabilities are required by the Marketplace for a Successful Career in IT?

The validation of the ITWF Outsourcing Decision Model described in Section 6.1 is related to the second research question:

Research question 2: What skills and capabilities are required by the marketplace for a successful career in IT?

The capabilities that the client and service provider managers are indicating are critical and emerging should all be considered required for a successful career in IT. When looked at as a group, these capabilities describe an individual with a balance of technical and what have often been called "soft" skills. The ITWF Outsourcing Decision Model helps to define the notion of "soft" skills in creating the two parameters: business communication/context and IT technical/context. Historically, an individual could have a very successful career in IT with capabilities in the purely technical areas. This is consistent with the previous era where the mission of IT was to *deliver* technology-based solutions. Today's marketplace is demanding a balance of IT technical/context capabilities along with business communication/context capabilities as the IT mission has evolved to *managing the process of delivering* technology-based solutions.

The ITWF Outsourcing Decision Model explicitly incorporates the broader capabilities required by the evolved mission of managing the process of delivering technology-based solutions, and therefore supports the IT manager in making the decisions and the trade offs between the purely technical and the extended technical/context and business communication/context skills.

In addition to looking at the responses listing skills and capabilities that are critical to maintain in house versus outsource, the survey asked managers about the specific capabilities that they were seeking when hiring at the entry and mid levels. As mentioned earlier, the data in these questions was not included unless the managers indicated that they were actually hiring by supplying a specific number of hires in each category and indicating job titles. This was done to ensure that the responses were real, i.e., not theoretical ideas about the capabilities sought.

The responses to this question are relevant to the ITWF Outsourcing Decision Model because they indicate the skills and capabilities that IT managers are seeking to hire in-house versus obtain through outsourcing. It is useful to look at what they are hiring to determine if the hiring activity would be predicted by the model.

In the following discussion, a comparison will be made between the capabilities sought in hiring versus those considered critical to maintain in house. Interpretation of this comparison is based on the interviews that accompanied the survey data for client organizations and on additional interviews performed with service providers. The next four sections will be used to answer the second research question.

6.3.2.1   *Entry-Level Hiring – Phase 1 Client Organizations*

Figure 14 lists the capabilities sought by client organizations in their entry-level hires. Entry-level hires are individuals who have just completed their undergraduate degrees. In the top ten (twelve shown because of ties) there are nine technical capabilities and three in the business domain category.

The obvious question is why are client organization managers seeking new hires with technical skills when these are the capabilities that they are most likely to outsource and are reporting will be declining in three years. Through the interview process it was determined that the senior level executives had the strong belief that learning programming skills as part of the undergraduate program provided a fundamental grounding in analysis and problem solving that they viewed as valuable. Second, the logical career path for entry-level hires is

toward project management (shown as a critical capability), where they would be managing programming and should have a basic understanding in order to do that well. Finally, since most of the respondents studied programming in their undergraduate programs, they felt comfortable requiring this and evaluating programming skills in an entry-level candidate.

It is also interesting to look at the three business domain capabilities. The first one, rated number five in importance, is communication. The interviews made clear that management is not satisfied with the new hires' ability to communicate. The managers emphasized this point and said that they could not afford to have new resources that had high technical capability but could not be allowed to talk with the user community because of their lack of communication skills. The importance placed on the general capability of "communication" supports the parameter in the ITWF Outsourcing Decision Model of "business communication/context" as a key capability in the human resource of an organization.

The second business domain capability is industry knowledge, rated in ninth position in importance. The research team found it intriguing that the respondents focused on technical skills and hiring from computer science programs, yet wanted the new hires to have industry knowledge, a skill that traditionally comes from having some industry experience. However, in the interviews it became

clear that because the new hires were slated for positions like project management, the more industry knowledge they had the easier it would be to move them into the positions quickly. In other words, the managers wanted even their new hires to "hit the ground running" at the very beginning of their management careers.

The third business domain capability of functional area process knowledge is last of the top ten. This is another business skill that the traditional computer science or IS graduate is less likely to obtain in the undergraduate program. However, this capability is clearly an important building block for project management and is logical when viewed with the other business domain skill requirements.

These results again point toward a mission change for the IT organization. In the past the primary mission was to deliver technology-based solutions to the organization. However the desire to hire entry-level candidates with a mix of technical and business domain skills implies a new mission of managing the process of delivering the technology-based solutions.

These results provide an answer to the second research question of what skills and capabilities are required by the marketplace for a successful career in IT. The capabilities reported by the client managers define what they are requiring in

their entry-level hires. These capabilities show the same pattern reported earlier of a balance between IT technical skills and business communication skills.

To compare these results to the ITWF Outsourcing Decision Model, it can be seen that managers are making the decision to hire in the left two quadrants: low to medium technical/context skills combined with low to high business communication/context skills. The interviews made it clear that the higher the business communication/context skills, the better. But it was also clear that high business communication/context skills were hard to obtain.

6.3.2.2   Mid-Level Hiring – Phase 1 Client Organizations

Figure 15 lists the capabilities sought by client organizations in their mid-level hiring. Mid-level hires are individuals with at least five years of work experience.

The responses to this question are relevant to the ITWF Outsourcing Decision Model because they indicate the skills and capabilities that IT managers are seeking to hire in-house versus obtain through outsourcing. It is useful to look at what they are hiring to determine if the hiring activity would be predicted by the model.

The project management capabilities predominate in this list, with eight in the top ten positions. These results are consistent with the interpretation that the mission

of the IT organization is changing from delivering solutions to managing the delivery of solutions. It is also consistent with the entry-level hiring interpretation that managers see the career path of new hires as one of project management.

The next highest number of capabilities, three, are in the business domain category and these are identical with those in the entry-level hire list: industry knowledge, functional area process knowledge and communication. Amusingly, communication is at the bottom of the list of business domain skills rather than at the top as in the entry-level list, implying that after five years of experience, communication is still important but more likely to be part of the package!

The remaining two skills are technical: systems analysis and systems design, rated at five and six in the top ten. However, as discussed previously, these are technical skills that have a requirement for client facing activities, and therefore have specialized business communication/context skills as a part of the requirement. These two capabilities can be thought of as hybrid capabilities rather than purely technical since the client-facing aspects pull in the business communication/context skills.

These results contribute to the answer to research question 2 on what the marketplace is demanding for a successful career in IT. Consistent with the

mission change, the marketplace is requiring project management and business domain capabilities in the mid-level hiring process.

In looking at the ITWF Outsourcing Decision Model, it appears that the mid-level hires will tend to be individuals with the capabilities that fall into the upper right quadrant: medium to high business communication/context skills and medium to high technical/context skills. This is consistent with the decision model as managers would be hiring those in house skills in this quadrant as these are less likely to be outsourced.

6.3.2.3   Entry-Level Phase 2 – Service Providers

The providers have supplied a different pattern of capabilities that they want in their entry-level hires than those of the client organizations. Both technical skills and business domain skills have four capabilities listed. There are three project management skills and one outsourcing skill.

It is interesting to look at the service provider phase to see if the providers hiring strategy will result in their having the skills and capabilities that the client organizations are planning to obtain through outsourcing to the providers. The ITWF Outsourcing Decision Model could also be used by the providers to help

them determine their decisions in what capability to hire and develop in house, versus obtain through their own outsourcing activities.

The number one skill is technical: programming. This is logical given the business of service providers. They need to have programming capability to carry out their services to customers. The second skill is communication. This is very high on their list and implies their understanding that their work with clients requires the capability to communicate. Functional area process knowledge (number four) and industry knowledge (number five) also match the capabilities on the client organization list and underline the importance to the provider managers that their in-house resources have business communication/context skills.

The providers and clients are both seeking technical/context skill foundations, but the providers are seeking more business communication/context skills in their entry-level hires. There are three possible reasons for this:

- The nature of the service provider business puts staff into client-facing positions even earlier than the client organizations and therefore the providers need these business communication/context capabilities in entry-level hires;

- There are a large number of SMEs in the provider sample and they do not have the corporate resources to train the skills they need, and therefore want

to hire them in (this interpretation can be tested when the data collection is completed and will be discussed as future research); or

The provider survey was done one year later than the client survey and the environment had changed.

Ultimately both the clients and providers are hiring from the same pool of entry-level candidates and they are both demanding a balance of skills that has not been traditionally provided in this pool. The provider results add information to both research question number 2 (skills and capabilities required by the marketplace for a successful IT career), research question number 3 (capabilities universities and colleges should be teaching their students to best serve the needs of the marketplace), and demonstrate that the balance of technical and business communication skills is even more important in their marketplace. This appears to be a departure of what is traditionally thought about service providers as "body shops" providing technical expertise. The providers are increasing their levels of management work with clients and therefore are also in need of capability to manage the delivery of IT solutions, not just to provide IT solutions.

6.3.2.4   *Mid-level Phase 2 – Service Providers*

Figure 17 shows the top capabilities listed by providers for hiring at the mid-level. The majority of these capabilities are project management (with five listed) and business domain (with four listed). The last three are technical skills.

The top two skills, project planning, scheduling and budgeting and project leadership are a perfect match with the top two on the client list. The next project management capabilities are numbers four and five: user relationship management and project risk management, which were four and three respectively on the client list. All four are very close matches. The last project management skill shown is negotiation in the tenth slot here but eighth position on the client list.

The four business domain skills are: functional area process knowledge (third), industry knowledge (sixth), communication (seventh), and business process redesign (tenth). The first three match the three on the client mid-level hire list, although the order differs.

The high position of all these capabilities with specialized business communication skills underlines the need that provider managers are showing for

capabilities to be acquired and maintained in house that will support their strategies to provide higher-level management work for their customers. Thus the providers can also use the proposed model to examine their in-house versus outsourced capability. They will be making these judgments from the position of anticipating what their customers will outsource to them.

The three technical skills are: systems analysis (eighth), systems design (ninth) and IT architecture and standards (tenth). The case has been made earlier that the first two are technical capabilities that require client-facing activities and therefore need medium to high business communication/context skills. They are appearing on several lists: client critical to keep in house, client outsourcing, provider critical to keep in house. The third, IT architecture and standards was also on the list for capabilities that clients outsource (tenth) and listed by both as emerging in importance. These three technical skills appear to have value for both clients and providers and would also seem to be capabilities that will be both maintained in house and outsourced by both groups.

In terms of the ITWF Outsourcing Decision Model, all the capabilities at the mid-level fall into the right two quadrants: low to high business communication/context skills and medium to high technical/context skills. These tend to be the skills that provider managers will be acquiring and maintaining in house.

6.3.2.5   *Summary of Discussions Related to Research Question Number Two*

This discussion of the client and provider choices of capabilities for entry and mid-level hiring has summarized and compared the top ten lists provided by each group of respondents. The differences at the entry-level are sharper than those at the mid-level. The clients are continuing to look for technical skills although with some business domain skills included. The providers are looking for more of a balance of technical, business domain and project management skills in their entry-level hires.

The mid-level hires in each group are a close match with both clients and providers seeking skills that have a high degree of specialized business communication capability.

Research question 2 is answered by the results reported here. The client managers and the provider managers have clearly defined the capabilities they seek in building their internal organizations. They have also clearly defined the capabilities they seek in entry and mid-level hires, reinforcing answers to question 1.

The parameters of the ITWF Outsourcing Decision Model support the logic of the decisions shown by these respondents.

6.4   IT Outsourcing Impact on Academia – Research Question Number Three

After the thorough discussion in Section 6.3 about what skills and capabilities the research respondents are seeking in the entry and mid-level hires, it is logical to look at the pipeline for those IT professionals and research question number 3:

Research Question 3: What capabilities should universities and colleges be teaching their students to best serve the needs of the marketplace?

One clear message that has come out of the interpretation of the data collected in the two phases is that both clients and service providers are demanding a mix of capabilities in their entry-level hiring that differs from those provided in most traditional computer science programs, and also from many information technology programs. A newly graduated student needs more business domain and project management skills in order to be valuable in the marketplace that has developed from the increase in outsourcing of IT capabilities.

This outcome is relevant to the ITWF Outsourcing Decision Model because it reflects the capability in the pool of individuals that clients and providers are seeking. The fewer graduates with the capability that the clients are seeking, the more the decision makers will be frustrated in their attempts to make strategic

decisions on the human resource, as characterized by the model. As a result the clients will have to turn to outsourcing to find the capability that they would strategically determine should be in-house staffed. On the other hand, if computer science and IT-related programs begin to graduate the individuals with the capability that is desired in the marketplace, then the decision makers will be able to carry out their strategies determining in-house staffing versus outsourcing.

These issues were addressed in one publication resulting from the research project where specific recommendations are made for how to evolve undergraduate programs to help produce students who can meet these requirements [Abraham, et. al., 2006].

Many undergraduate programs have internships where students work with and in companies. However, these are often in isolated, technology-focused task environments and do not provide the kind of experience that would help students to build their capabilities in industry knowledge, communication, project management, etc. There is strong evidence provided by the survey results to call for an evolving of undergraduate programs towards the provision of capabilities that the marketplace is demanding. Research question 3 specifically asks what capabilities should universities and colleges teach their students to best serve the needs of the marketplace. The data results answer this question by indicating the capabilities that graduates should have when they have completed the

programs: basic, foundational IT technical skills along with business communication/context skills that can only be obtained by working in organizations on projects that provide exposure to the business environment of the organization. As industry knowledge is one capability that is desired by both client and provider organizations, any work in an organization is going to provide the student with a specific set of industry knowledge. Therefore it makes sense for the students to choose projects (and for the faculty to provide opportunities) in industries that are of interest for their future careers. This is a different focus than the traditional one where projects in organizations have been chosen based on the technical product that the student would be gaining experience using.

Research question 3 has been answered by the responses of the managers in Phases 1 and 2 of the survey.

6.5 The Role of Absorptive Capacity in Human Resource Management – Research Question Number Four

The fourth research question relates to the concept of absorptive capacity:

Research Question 4: Does the concept of absorptive capacity have relevance for IT management in the development of its human resource to benefit the organization and gain competitive advantage?

Absorptive capacity (ACAP) describes the ability to assimilate knowledge and problem-solving skills for the purpose of creating new knowledge that will support innovation and ultimately benefit the organization by providing competitive advantage. Many would agree that ACAP helps to define human resource management. The four capabilities usually associated with ACAP - acquire, assimilate, transform, and exploit knowledge – embody what managers seek when they are developing the capabilities in their organizations, and IT management is no different. The question raised by the opportunity to outsource capability is how to create a human resource strategy that results in the best mixture of in-house and outside capability to ensure the benefits of ACAP, i.e., the ability to acquire, assimilate, transform and exploit knowledge to benefit the competitive position of the organization.

The ITWF Outsourcing Decision Model provides a simple way to:

1. Evaluate the acquisition decision, i.e., should the capability be acquired through outsourcing or acquired through hiring in-house;

2. Evaluate the ability to exploit the knowledge, i.e., determine where the knowledge is or will be in order to exploit it.

ACAP has relevance and can be supported by the ITWF Outsourcing Decision Model.

7. Summary and Future Research

This research has proposed a model to help practicing managers decide whether to build human resource capability in house or outsource it to service providers. The two parameters utilized in this model are the business communication/context capabilities and the IT technical/context capabilities. These are proposed as surrogates for determining asset specificity, which has been shown to be a useful way to determine whether a capability should be maintained in house or outsourced. In the practice of strategic management in organizations, the calculations that have been proposed for asset specificity, based on transaction cost economics, are beyond the interest of managers and are therefore not carried out. This model is a simplification that can be easily applied by managers in practice.

The model was illustrated with data collected as part of an international effort sponsored by SIM to determine the capabilities that client and service providers seek to acquire through either through in-house hiring and development or through outsourcing. The model application was also illustrated with a case study.

The model was developed as a result of the author's participation in the data collection effort and was not explicitly tested as part of the research effort. Rather the data from the surveys were used to illustrate the logic of the model.

Future research to determine explicit measures of business communication/context capability and IT technical/context capability should be done to provide more information to the manager using the model. The scale definitions used here were developed from observations in the course of the research interviews and surveys. However they were not explicitly measured to determine if they are the best descriptions or complete descriptions. In addition the model itself could be employed in a research effort to see how easily it is understood and what value it brings to the practicing manager.

The data analysis for the SIM-sponsored research is on going and may provide additional opportunities to evaluate the logic and usefulness of the model. For example, as mentioned previously there was a large number of SMEs included in the second phase of data collection. Part of the analysis will be to investigate differences in the responses to the survey based on the size of the provider organizations. Organization size may have an influence on the specific skills and capabilities that providers hire at the entry-level. SMEs may need a different balance of business communication/context skills and IT technical/context skills.

8. Conclusions

As global outsourcing of IT services increases the number of decisions regarding which capabilities are outsourced and which are developed in house will increase. This research argues that information and communication technology is part of the organization's strategy and contributes to competitive advantage. The Resource-Based View (RBV) proposes that firm performance depends on its unique resources. Capabilities of the human resource are one of the useful assets that can be applied to detecting and responding to market opportunities or threats. Therefore the capability of the IT human resource is a factor in an organization's competitive advantage. RBV provides the theoretical foundation to support this viewpoint.

A second theoretical antecedent is absorptive capacity (ACAP), which is focused on the ability to assimilate knowledge and problem-solving skills for the purpose of creating new knowledge that will support innovation and ultimately benefit the organization by providing competitive advantage. Management concerns about the quality of their human resources reflect the theories of ACAP, and help to influence hiring decisions that will contribute to the organization's competitive potential. Thus ACAP provides a research foundation for the ITWF Outsourcing Decision model presented in this dissertation by establishing the importance to

the competitive advantage of the organization of acquiring, assimilating, transforming and exploiting knowledge.

Building on the theoretical foundations of RBV and ACAP, together with the result of the SIM-sponsored research, the ITWF Outsourcing Decision Model was presented as a practical tool for managers to support their decisions regarding hiring versus outsourcing for IT capabilities.

Decisions made using the logic of the model were compared to the actual decisions that managers made (as reported in the research and in a case study) and were found to be consistent.

The ITWF Outsourcing Decision Model was shown to be a simple, logical model that can be used by practicing managers in their decisions regarding IT capabilities and whether these should be maintained in house or outsourced to providers. The model is proposed as a new tool that can be used in conjunction with other practices, (for example, cost-benefit analyses) to determine the most beneficial (i.e., contributes positively to competitive positioning) strategic actions in the realm of global outsourcing.

Appendix 1 Glossary of Outsourcing Terms

Numerous terms are used indiscriminately to describe the activity when a client organization allocates some of its work to be done by employees of another organization. Originally this was called "outside contracting." In 1989 when Kodak undertook a massive amount of outside contracting to refocus its internal efforts on what it considered to be its main businesses, the press called this activity outsourcing. Kodak's activity differed in that it involved a close working relationship or partnership between Kodak and each of its primary vendors (now called service providers because the term vendor has lost favor!). This differentiated the outside contracting that Kodak was doing from other forms of contracting which were much more transactions oriented. The name outsourcing stuck – being rather more interesting sounding than outside contracting. However, in recent years, the term has been misused. It has been applied to any form of contract work being carried out by non-employees, and even more recently has been closely associated with work done in a foreign country. Many additional terms have evolved (and continue to evolve on a regular basis) to describe various forms of outsourcing. Some of these are described below.

- Captive Centers – term used to describe the office that a client organization sets up and owns in a location different from the

headquarters location of the client organization. The purpose of the office is to carry out activities in a lower-wage location than the client location. Some organizations refer to this as "off-shoring" their activities. Recently there has been an attempt to rename these (as "captive" is not politically correct) to Pods.

- Co-Sourcing – term used to describe when a client firm and a service provider (SP) work closely together including intermixing reporting lines, e.g. client firm employees may be supervised and evaluated by SP managers and vice versa.

- Farming – this refers to outsourcing to other parts of the client firm's country where the cost of living is lower than where the client firm is located. For example, in the U.S. this is outsourcing to SPs located in states like Nebraska and the Dakotas.

- Home-shoring – term used to describe people working from their homes who accept lower wages for the convenience of working from home. The majority of these workers are women caring for children and the disabled. This is frequently used for call center operations.

- In-sourcing – this term is used in three ways: 1) to describe the activities that are not outsourced, 2) to describe activities that are newly brought in house when others are outsourced and 3) to describe the bringing of activities back in house after they have been outsourced.

- ITO – this is an abbreviation for Information Technology Outsourcing and refers to any outsourcing of IT tasks or functions. Additional abbreviations are coming into use, such as BPO for Business Process Outsourcing, KPO for Knowledge Process Outsourcing, HRO for Human Resources Outsourcing, and LPO for Legal Process Outsourcing. Each of these terms is used in a variety of ways and should be clearly defined before being used in a business context.

- Near-shore (also near-shoring) – outsourcing that takes place in a country other than the client firm's country, but one that is nearby. For example, outsourcing to an SP in Costa Rica is considered near-shoring for the U.S.

- Off-Shore Outsourcing – outsourcing to an SP located in a different country

- Off-shoring – this term is used in two ways: 1) synonymously with off-shore outsourcing, and 2) to describe a company that has setup its own captive division operating in a foreign country. The second definition is generally becoming the more popular use of the term.

- On-shore (also on-shoring) – outsourcing to a SP within the same country.

- Outsourcing – originally the most general form used to describe sending work to a SP to be performed, but now confused with the location of the work.

- Out-tasking – this term is used to describe outsourcing when it is done on a task basis as opposed to on a project basis. For example, if the

programming segment of a major system design were outsourced, but the rest of it was not.

- Partnership – this term in business has had a consistent problem. The primary issue is that it is a legal term defining a relationship between two legal entities. However, it is often used to describe a close working relationship between two organizations without the legal definition. As discussed above, originally it was this aspect of what Kodak was doing that resulted in the new term outsourcing being coined to show that it was different from the traditional outside contracting. In this regard, partnership is still used to describe a close working relationship, one that requires an investment on both parties to maintain. This is as opposed to a transaction relationship that requires very little maintenance and is usually just a fee-for-service activity.

- Project based outsourcing – describes outsourcing when an entire project is outsourced to a SP.

- Re-Sourcing – this term is being used by some consultants to describe their relocation of human resources to geographical areas that are designated as or becoming centers of excellence in a particular capability. IBM, for example, uses the term Global Re-sourcing (or GR) to describe their concentration of expertise in specific locations outside the U.S.

- Right sourcing – Consulting term that means you have made the best decisions about what tasks to outsource versus maintain in house

- Smart sourcing – see "right sourcing"

- Sourcing – most general form that can be applied to any work carried out by non-employees

- Staff extension outsourcing – describes outsourcing when an organization needs to augment the in-house staff. Also called staff augmentation and body shopping.

- Sub contracting – the oldest term for outsourcing

- Utility computing - is when a SP makes available computer resources to client organizations and bases the charges on usage. Computing resources are metered analogous to purchasing electricity. This is also called On Demand Computing.

Appendix 2 Research Team

SIM Researcher Team for Phases 1 and 2 Combined

The following researchers made up the original team that conducted the SIM-sponsored research project. All team members collected data and contributed it to the central database.

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Erran Carmel	American University
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Keith Frampton	The Marlo Group (also RMIT University)
Mike Gallivan	Georgia State University
Kevin Gallagher	Northern Kentucky University
Stuart Galup	Florida Atlantic University
Tim Goles	University of Texas-San Antonio
Steve Hawk	University of Wisconsin-Parkside
Joy Howland	Seattle SIM
Kate Kaiser	Marquette University
Seamas Kelly	University College Dublin
Mary Lacity	University of Missouri St. Louis
John Mooney	Pepperdine University
Judith Simon	University of Memphis
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Joe Rottman	University of Missouri St. Louis
Terry Ryan	Claremont Graduate School
Rick Wion	Smith Bucklin Associates

Appendix 3 Skills and Capabilities in Interview and Survey

Phase 1 Skills and Capabilities List in Five Categories

TECHNICAL
Systems Analysis
Systems Design
Programming
System Testing
Database Design/Management
Data Warehousing
IT Architecture/Standards
Voice/Data Telecommunications
Operating Systems
Server Hosting
Security
Mainframe/Legacy
Operations
Continuity/Disaster Recovery
Desktop Support/Helpdesk
Other
BUSINESS DOMAIN
Industry Knowledge

Company Specific Knowledge
Functional Area Process Knowledge
Business Process Design/Re-engineering
Change Management/Organizational Readiness
Managing Stakeholder Expectations
Communication
Other
PROJECT MANAGEMENT
Project Planning/Budgeting/Scheduling
Project Risk Management
Negotiation
Project Leadership
User Relationship Management
Project Integration/Program Management
Working with Virtual Teams
Working Globally
Capability Maturity Model Utilization
Other
OUTSOURCING
Sourcing strategy
Third party provider selection
Contracting and legal
Managing 3rd party providers

Other
IT ADMINISTRATION
Financial Management
Internal HR management
IT Governance
Other

Phase 2 Additional Skills and Capabilities – One New Category

OUTSOURCING – EFFECTIVE SELLING
Customer/Product Service Go-to-Market Strategy
Customer Selection or Qualification
Contracting and Legal
Managing Customer Relationships

Bibliography

ABRAHAM, T., BEATH, C., BULLEN, C., GALLAGHER, K., GOLES, T., KAISER, K., and SIMON, J. 2006. "IT Workforce Trends: Implications For IS Programs," *Communications of the Association for Information Systems*, Vol. 17, Article 50, June 2006.

ANG, S., SLAUGHTER, S. 2004. Turnover of Information Technology Professionals: The Effects of Internal Labor Market Strategies. *The DATA BASE for Advances in Information Systems* 35, 3, 11-28.

ANG, S., SLAUGHTER, S.A. 2001. Work Outcomes and Job Design For Contract versus Permanent Information Systems Professionals On Software Development Teams. *MIS Quarterly* 25, 3, 321-350.

ANG, S. STRAUB, D. 1998. "Production and Transaction Economies in IT Outsourcing: A Study of the U.S. Banking Industry," *MIS Quarterly*, (22:4 December), 1998, pp.535-552.

ANONYMOUS. 2005. Calling a Change in the Outsourcing Market. Deloitte Consulting Report (April)..

ANONYMOUS. 2004. Six-Month Assessment of Workforce Globalization in Certain Knowledge-Based Industries. *Technology Administration (July)*. P1-12.

ARNETT, K.P., LITECKY, C. R., 1994. Career Path Development for the Most Wanted Skills in the MIS Job Market. *Journal of Systems Management*, February, 45, 2, 6-11.

BARNEY, J.B., 1991. Firm Resources and Sustained Competitive Advantage, *Journal of Management*, 17:1, 99-120

BULLEN, C.V., ROCKART, J.F., 1981. A Primer on Critical Success Factors, MIT Center for Information Systems Research Working Paper Number 69, June 1981.

BUNGE, Mario, 2001. *Philosophy in Crisis: The Need for Reconstruction*, Prometheus Books, 2001, P46.

8

BYRD, T. A., TURNER, D. E. 2001. An Exploratory Analysis of the Value of the Skills of IT Personnel: Their Relationship to IS Infrastructure and Competitive Advantage. *Decision Sciences*, Winter, 32, 1, 21-54.

CAPPEL, J. J. 2001-2002. Entry-Level IS Jobs Skills: A Survey of Employers. In *The Journal of Computer Information Systems (Winter, 2001-2002)* 42, 2, 76-83.

CARR, N. 2003. IT Doesn't Matter. *Harvard Business Review* 81, 5, 41-49.

CHAMBERLIN, E. 1933. *Theory of Monopolistic Competition*, Harvard University Press, Cambridge, MA 1933.

CHATTERJEE, S. 1998. Delivering Desired Outcomes Efficiently: The Creative Key to Competitive Strategy, *California Management Review*, 40, 78-95.

CHRISTENSEN, C., OVERDORF, M. 2000. "Meeting the Challenge of Disruptive Change," *Harvard Business Review*, Vol. 78, No.2, 2000, pp. 67-75.

COASE, R.H. 1937 "The Nature of the Firm," *Economica*, 4(n.s.), 1937, 386-405.

COHEN, W.M., LEVINTHAL, D.A.,1990. "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly*, Vol. 35, 1990, pp. 128-152.

DAY, G., 1994. "The Capabilities of Market-Driven Organizations," *Journal of Marketing*, Vol. 58, No. 4, 1994, pp.37-52.

FOOTE, D., 2005. "Managing IT Organizations and Professionals" presentation to The Advisory Council, Foote Partners, LLC.

GALLIVAN, M. J., TRUEX III, D. P., KVASNY, L. 2004. Changing Patterns in IT Skill Sets 1988-2003: A Content Analysis of Classified Advertising. *Database for Advances in Information Systems (Summer)* 35, 3, 64-88.

GEORGE, J.F., VALACICH J.S., AND VALOR J. 2005. Does Information Systems Still Matter? Lessons for a Maturing Discipline. *Communications of the Association for Information Systems 16*, 219-232.

GOLES, T. 2001. "The Impact of Client-Vendor Relationship on Outsourcing Success," University of Houston, Houston, Texas, 2001.

GOMES P.J. AND JOGLEKAR N.R. 2005. The Costs of Coordinating Distributed Software Development Tasks. *Working Paper.*

GOMORY, R.E., BAUMOL, W.J. 2004. Presentation and personal communication in conjunction with the conference "Understanding Global Outsourcing," December 9-10, 2004, NYU Stern School, New York.

GOMORY, R.E., BAUMOL, W.J. 2000. *Global Trade and Conflicting National Interests*, The MIT Press, Cambridge, MA, 2000.

GORGONE, J., GRAY, P., FEINSTEIN, P. KASPER, G.M., LUFTMAN, J.N., STOHR, E. A., VALACICH, J. and WIGAND, R.T. (2000) MSIS 2000: Model Curriculum And Guidelines For Graduate Degree Programs In Information Systems, *Communications of the Association for Information Systems*, 3, 1.

GOTTFREDSON, M, PURYEAR, R, AND PHILLIPS, S. 2005. Strategic Sourcing: From Periphery to the Core. In Harvard Business Review (February).

HOMANS, G.C., 1958. "Social Behavior as Exchange," American Journal of Sociology, Vol. 63, pp.597-606.

GRANT, R.M., 1991. "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation," *California Management Review* (33:1), 1991, pp. 114-135.

HEDMAN, J., KALLING, T., 2001. "The Business Model: A Means to Understand the Business Context of Information and Communication Technology," Institute of Economic Research Working Paper Series, Lund University School of Economics and Management, ISSN 1103-3010, ISRN LUSADG/IFEF/WPS-001/9-SE.

ITAA 2004. Adding Value...Growing Careers - The Employment Outlook In Today's Increasingly Competitive It Job Market. *Information Technology Association of America (ITAA) Annual Workforce Development Survey (September)*.

IVES, B., VALACICH, J., WATSON, R., ZMUD, R., 2002. What Every Business Student Needs to Know About Information Systems. *Communications of the AIS* 9, 467-477.

KAISER, K.M., HAWK, S.2004. "Evolution of Offshore Software Development: From Outsourcing to Cosourcing," *MIS Quarterly Executive*, 3 (2), June 2004, 69-81.

KEEN, P.G.W., SCOTT MORTON, M.S. 1978. *Decision Support Systems An Organizational Perspective*, Addison-Wesley, 1978, pp. 11-12.

KIECOLT, K.J., NATHAN, L.E. 1985. *Secondary Analysis of Survey Data*, Sage Publications, 1985.

KOONG, K. S., LIU, LAI C., LIU, X. 2002. A Study of the Demand for Information Technology Professionals in Selected Internet Job Portals. *Journal of Information Systems Education* 13, 1, 21-29.

LACITY, M.C., 2002. "Lessons in Global Information Technology Sourcing," *Computer*, August 2002, pp. 26-33.

LACITY, M.C., Willcocks, L.P. 2001. *Global Information Technology Outsourcing: In Search of Business Advantage*, Wiley, 2001, p.188.

LACITY, M., Willcocks, L.P., Feeny, D.F. 1995. "IT Outsourcing: Maximize Flexibility and Control," *Harvard Business Review*, May-June, 1995, pp. 84-93.

LEE, D.M.S., TRAUTH, E. M., FARWELL, D. 1995. Critical Skills and Knowledge Requirements of IS Professionals: A Joint Academic/Industry Investigation. *MIS Quarterly* (September) 19, 3, 313-341.

LEVINA, N., ROSS, J.W. 2003. "From the Vendor's Perspective: Exploring the Value Proposition in IT Outsourcing," *MIS Quarterly* 27:3, 9/03, pp. 331-364.

LITECKY, C. R., ARNETT, K. P., PRABHAKAR, B. 2004. The Paradox of Soft Skills Versus Technical Skills in IS Hiring. *The Journal of Computer Information Systems* (Fall) 45, 1, 69-77.

LITECKY, C.R., PRABHAKAR, B. AND ARNETT, K. P. 1996. MIS Job Market: Shaken But Not Stirred. *Journal of Systems Management* (July/August) 47, 4, 50-54.

LUFTMAN, J.N., BULLEN, C.V., LIAO, D., NASH, E., NEUMANN, C., 2004. *Managing the Information Technology Resource: Leadership in the Information Age*, Pearson Prentice Hall, 2004, p.321.

MALHOLTRA, A., GOSAIN, S., EL SAWY, O., 2005. "Absorptive Capacity Configurations in Supply Chains: Gearing for Partner-Enabled Market Knowledge Creation," *MIS Quarterly*, March 2005, Vol. 29, No. 1, pp 145-187

MELVILLE, N., Kraemer, K., Gurbaxani, V., 2004. Information Technology and Organizational Performance: An Integrative Model of IT Business Value, *MIS Quarterly*, Jun 2004, 28, 2.

NAKAYAMA, M., SUTCLIFFE, N. G. 2001 "IT Skills Portfolio Research in SIGCPR Proceedings: Analysis, Synthesis and Proposals," *ACM SIGCPR*, 1-58113-361.

PENROSE, E. 1959. *The Theory of the Growth of the Firm*, Basil Blackwell, London, 1959.

POPPO, L, ZENGER, T. 1998. "Testing Alternative Theories of the Firm: Transaction Cost, Knowledge-Based and Measurement Explanations for Make-or-Buy Decisions on Information Services," *Strategic Management Journal*, Vol. 19, No. 9, 1998, pp. 853-877.

PRABHAKAR, B., LITECKY, C.R. AND ARNETT, K.P., 2005. "IT Skills in a Tough Job Market," *Communications of the ACM*, October 200, Vol. 8, No.10, 91-104.

PRAHALAD, C.K., HAMEL, G., "The Core Competence of the Corporation," *Harvard Business Review*, (68:3), 1990, pp. 79-92.

ROBINSON, J., 1933. *Economics of Imperfect Competition*, MacMillan Press, London, 1933.

ROSE, C., Interview on "The Charlie Rose Show," 2/28/06, http://www.charlierose.com/.

ROSS, J. W., BEATH, C. M. AND GOODHUE, D. L. 1996. Develop Long-Term Competitiveness Through IT Assets. *Sloan Management Review* 3813; 38, 1, 31–42.

ROTTMAN, J.W., LACITY, M.C. 2004a. "Proven Practices for IT Offshore Outsourcing," *Cutter Consortium Executive Report*, Vol. 5, No. 12, p1-31.

ROTTMAN, J.W., LACITY, M.C. 2004b. "Twenty Practices for Offshoring Sourcing," *MISQE* Vol.3, No.3, September 2004.

RYAN, M.P., FARRELL, M.C., AND DOERFLINGER, T.M. 2005. "Where Have All the Workers Gone?," UBS Financial Services Report, *UBS Wealth Management*, 27 June 2005.

SAUNDERS, C., GEBELT, M., HU, Q. 1997. "Achieving Success in Information Systems Outsourcing," *California Management Review* 39:2, Winter 1997, PP.63-79

SLAUGHTER AND ANG. 1996. Employment Outsourcing in Information Systems. *Communications of the ACM* (July) 39, 7, 47-55.

SMITH, A. 1776. "An Inquiry Into the Nature and Causes of the Wealth of Nations," available on line at www.econlib.org/library/Smith/smWN.html

TAPSCOTT, D. 2004. The Engine That Drives Success: The Best Companies Have the Best Business Models Because They Have the Best IT Strategies. *CIO Magazine* (May) pp1-6.

TRAUTH, E.M., FARWELL, D., LEE, D.M.S.1993. "The I/S Expectation Gap: Industry Expectation vs. Academic Preparations, *MIS Quarterly*, 17:3, 293-308.

TREWYN, P. 2005. U.S. faces IT worker shortage. *Milwaukee Business Journal*, http://milwaukee.bizjournals.com/milwaukee/stories/2005/05/23/focus3.html, May 20, last viewed November 13, 2005.

VAN SLYKE, KITTNER AND CHENEY. 1998. Skill Requirements for Entry-Level Information Systems Graduates. *Journal of Information Systems Education* (Fall), 6-10.

WADE, M., HULLAND, J., 2004. The Resource-Based View and Information Systems Research: Review, Extension and Suggestions for Future Research, *MIS Quarterly*, Mar 2004, 28, 1.

WIKIPEDIA, http://www.wikipedia.org

ZAHRA, S.A., GEORGE, G., 2002. "Absorptive Capacity: A Review , Reconceptualization, and Extension," Academy of Management Review, 2002, Vol. 27, No. 2, pp185-203.

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Publications

Refereed Journal Articles

"A Case Study of Office Workstation Use," by C.V. Bullen, J.L. Bennett, and E.D. Carlson, *IBM Systems Journal*, Vol. 21, No. 3, 1982.

"What to Expect from Teleconferencing," by Robert Johansen and Christine Bullen, *Harvard Business Review*, March-April, 1982.

"Future Role of the Information Systems Executive," by John Rockart, Leslie Ball, and Christine V. Bullen, *MIS Quarterly*, December 1982.
"Plugging Into Strategic Partnerships: The Critical IS Connection," by John C, Henderson with contributions by Christine V. Bullen, *Sloan Management Review*, Vol. 31, No. 3, Spring, 1990.

Abraham, Thomas, Cynthia Beath, Christine Bullen, Kevin Gallagher, Tim Goles, Kate Kaiser, and Judith Simon, "IT Workforce Trends: Implications For IS Programs," *Communications of the Association for Information Systems*, Vol. 17, Article 50, June 2006.

Zwieg, P., Kaiser, K. M., Beath, C., Bullen, C., Gallagher, K., Goles, T., Howland, J., Simon, J. Abbott, P., Abraham, T., Carmel, E., Evaristo, R., Hawk, S., Lacity, M., Gallivan, M., Kelly, S., Mooney, J., Ranganathan, C., Rottman, J., Ryan, T., Wion, R., " The Information Technology Workforce Trends and Implications 2005-2008," *MIS Quarterly Executive* 5(2), 2006 (Refereed)

Bullen, C.V., Abraham, T., Gallagher, K.P., Kaiser, K.M., Simon, J.C., (2007) Changing IT Skills: The Impact of Sourcing Strategies on In-House Capability Requirements, special issue on Offshoring and Outsourcing: The Innovation and its Impact on Electronic Commerce in Organizations in *Journal of Electronic Commerce in Organizations*, 5 (2), 24-46.

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Bullen, C.V., Abraham, T., Galup, S., "IT Workforce Trends: Implications for Curriculum and Hiring," *Communications of AIS*, Volume 20, Article 34, October 2007.

Refereed Conference Proceedings

"A Case Study of Office Workstation Use," by C.V. Bullen, J.L. Bennett, and E.D. Carlson, *Proceedings of the SIGOA Conference on Office Information Systems*, ACM, June 21-23, 1982 (revised and abbreviated version).

"Requirements for Office Tools Used by Administrative Managers and Professionals," by Christine V. Bullen and John L. Bennett, *Proceedings of the Fourth International Conference on Information Systems*, December 15-17, 1983.

"Learning from User Experience with Groupware," By Christine V. Bullen and John L. Bennett, *Proceedings of the Conference on Computer-Supported Cooperative Work*, October 7-10, 1990.

"The Impact of Sourcing on the IT Workforce Pipeline," by Christine V. Bullen, Kate Kaiser and Tim Goles, *Proceedings for AMCIS2006*, August, 2006. (Refereed proceedings)

Bullen, C.V., Howland, J., "How Educational Programs Cn Respond to the Changing IT Workforce, " *Proceedings of PICMET2007*, (August 2007)

Edited Books

The Rise of Managerial Computing, Christine V. Bullen and John F. Rockart, editors, Dow Jones-Irwin (1986).

Book Chapters

"What to Expect from Teleconferencing, by Robert Johansen and Christine Bullen, in *"Teleconferencing and Beyond: Communications in the Office of the Future*, R. Johansen, McGraw-Hill (1984).

"Company Experiences with End-User Computing, by Christine V. Bullen, in *Managers, Micros and Mainframes: Integrating Systems for End Users*, M. Jarke, editor, John Wiley & Sons (1986).

"Thinking Ahead: What to Expect from Teleconferencing," by Robert Johansen and Christine Bullen, in *Computer-Supported Cooperative Work: A Book of Readings*, Irene Greif, editor, Morgan Kaufmann Publishers (1988).

"Groupware in Practice: An Interpretation of Work Experiences," by C.V. Bullen and J.L. Bennett in *Groupware and Computer-Supported Cooperative Work: Assisting Human-Human Collaboration*, written and edited by Ronald M. Baecker, Morgan Kaufmann, (1993).

"Critical Success Factors and Productivity," by Christine V. Bullen, in *Productivity in the Office and the Factory*, Paul Gray and Jaak Jurison, editors, Boyd and Fraser (1994).

"Groupware in Practice," by C.V. Bullen and J.L. Bennett, in *Computerization and Controversy: Value Conflicts and Social Choices*, Rob Kling, editor, Academic Press, Inc., second edition (1996).

Managing the Information Technology Resource: Leadership in the Information Age, Jerry N. Luftman with Christine V. Bullen, Donald Liao, Elby Nash, and Carl Neumann, Pearson Prentice Hall (2004).

Invited Articles/Reviews

AMCIS Conference Management Guide which is the handbook for running AMCIS conferences. (Author of current version)

"Using Critical Success Factors to Plan for End-User Computing," by Christine V. Bullen, *Managing the Information Center Resource*, Auerbach Publishers, Inc., 1986.

"Reexamining Productivity CSFs: The Knowledge Worker Challenge," by Christine V. Bullen, *Information Systems Management*, Auerbach Publications, Vol. 12, No. 3, Summer 1995.

"The Expert Opinion: An Interview with Daniel E. Klinger, Senior Vice President, Bristol-Myers Squibb Worldwide Medicines Group," interviewed by Christine V. Bullen, *Journal of Global Information Technology Management*, Vol 4, No. 2, 2001.

"The Information Technology Workforce: Trends and Implications 2005-2008," By Christine V. Bullen Along With 20 Members of The SIM Research Team, *SIM White Paper*, 3/6/06.

Bullen, Christine V., "Critical IT Skills Needed in Financial Services," *FSO Magazine*, Q3 2007, pp. 18-20.

Working Papers

Center for Technology Management Research Working Papers

06/10	"The Impact of Sourcing on the IT Workforce Pipeline," AMCIS 2006 (forthcoming)	Bullen, Christine V. Kaiser, Kate Goles, Tim
06/21	"The Impact of Sourcing on the IT Workforce Pipeline," AMCIS 2006	Bullen, Christine, V. Goles, Tim Kaiser, Kate
06/24	"IT Workforce Trends: Implications for IS Programs," CAIS 17, Article 50, June 2006	Abraham, Thomas Beath, Cynthia Bullen, Christine V. Gallagher, Kevin Goles, Tim Kaiser, Kate Simon, Judith

MIT Center for Information Systems Research Working Papers

(in chronological order)

"Centralization Versus Decentralization of Information Systems: A Preliminary Model for Decision Making," by Christine V. Bullen, MIT Center for Information Systems Research, April 1977.

#39	The Management of Distributed Processing	12/78
#50	Distributed Processing at Champion International: A Case Study of Software Productivity	10/79
#69	A Primer on Critical Success Factors	6/81
#73	Overview of the User Needs Survey Research Project	6/81
#84	A Case Study of Office Workstation Use	3/82
#102	Office Workstation Use by Administrative Managers and Professionals	4/83
#106	What to Expect from Teleconferencing	7/83
#169	Groupware: A Key to Managing Business Teams?	5/88
#205	Groupware in Practice: An Interpretation of Work Experience	3/90

Honors

The Bright Idea Award in Information Technology, sponsored by the Stillman School of Business at Seton Hall University and the NJPRO Foundation, 2006.

The 2001 Gladys and Henry Crown Award for Faculty Excellence at Fordham University (Chosen by the graduating classes of 9/2000, 2/2001 and 5/2001)

The President's Award at Arthur D. Little, Inc., 1974.

Other:

Career Highlights

- In 2007, I worked with a group of people to launch the Global Sourcing Council and am currently serving as its first president. The GSC is a non-profit organization focused on providing a forum for the discussion of the social and economic impacts of global sourcing. Membership in the GSC is open to all stakeholders in global sourcing: private enterprise, government organizations, academia, interested individuals and organizations.
- SIM sponsored research in IT Workforce Trends and Issues – member of 10-person team studying the IT workforce in the U.S. and Europe. This has been (and continues to be) a fascinating process of getting 10 world-class researchers to work together to collect a major international database for analysis. I have led the group in terms of interviews and I have developed and maintained the database. Many articles are in the process of submission from this research effort.
- The Howe School hosted the AMCIS 2004 conference in New York City and I served officially in the role of Program Co-Chair, however unofficially served as the general chair, webmaster and local arrangements chairs as well. This conference was a huge success and the largest ever held by AIS. While it was an enormous amount of work, it was also very satisfying to successfully work with 1200 authors and reviewers, and host almost 1500 attendees.
- I received the 2001 Gladys and Henry Crown Award for Faculty Excellence at Fordham University. This was a highlight of my Fordham career as it was voted on by three graduating classes.
- The majority of my academic career (17 years) was spent at the MIT Sloan School Center for Information Systems Research (CISR). I help to launch CISR and participated in ground-breaking research projects that are still considered significant today.
- I was among the "dirty 30" faculty who launched the ICIS conferences. This conference has continued to serve as the premier research conference in our field and I am proud to have been there to get it started.
- After working at Arthur D. Little, Inc for 6 years, I became part of a client team that traveled completely around the world in 4 months conducting interviews and collecting data on the use of controlled substances in all branches of U.S. Military forces. This trip took me to California, Hawaii, Thailand (on the border of Cambodia during the Viet Nam war!), Afghanistan, Turkey, Italy and Spain. It was exhilarating, exhausting, and dangerous and resulted in the most significant data ever collected in this area. As a result of this work, I was presented with the President's award.