

How Information Technology Professionals Keep From Being Outsourced or Offshored

Ron Fulbright
University of South Carolina Upstate
800 University Way
Spartanburg, SC 29303
(864) 503-5683
fulbright@uscupstate.edu

Richard L. Routh
University of South Carolina Upstate
800 University Way
Spartanburg, SC 29303
(864) 503-5030
routh@uscupstate.com

ABSTRACT

This paper introduces the concept of the “vendible line” partitioning jobs in a company into those that are likely to be lost to outsourcing (onshore or offshore) and those that are not likely to be lost. Using this concept, we identify the critical professional skills IT graduates must have to maximize their ability to stay above the vendible line and be immune to such job loss. We then suggest changes to the proposed accreditation standard for IT being synthesized by SIGITE. Suggested changes include the addition of communication, management, and security courses.

Categories and Subject Descriptors

K.3.2 [Computer and Information Science Education]: accreditation, computer science education, curriculum, information science education.

General Terms

Management, Human Factors, Standardization.

Keywords

Outsourcing, offshoring, near shoring, IT curriculum design

1. INTRODUCTION

Recently, the information technology (IT) profession has seen an increasing number of jobs outsourced and offshored to the extent that we, as educators, are fielding questions from students asking if there will be any IT jobs at all when they graduate. What do we tell them and how do we alter our curricula in response to the changing market demand for our graduates?

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. SIGITE '04, October 28–30, 2004, Salt Lake City, Utah, USA. Copyright 2004 ACM 1-58113-936-5/04/0010...\$5.00.

Offshoring should not be a surprise, and indeed, it should have been expected. The electronics, semiconductor, textile, steel, and automotive industries, among others, have all witnessed similar migration to foreign shores for the same reasons. Companies are drawn to offshoring because significant savings can potentially be realized by relocating work to countries with employees working for a fraction of the wages domestic employees demand. Indeed, it seems that any manufacturing-based industry goes through an offshoring phase as it matures. Even though initial expectations may have been too optimistic, offshoring is a trend likely to continue for the foreseeable future and is a reality IT must face [6].

At first, it may seem an odd notion to consider IT as a manufacturing-based industry. But when one realizes that, for example, every line of code has to be produced by a developer and that there is little difference between crafting a computer program and stitching together a shirt, one sees the truth. Many areas of IT are becoming commodity-based. Relatively few barriers to entry into the market and little differentiation between vendors result in IT resources being traded principally on price—the definition of a commodity [5].

Outsourcing is attractive because it is usually more cost effective for a company to purchase commodities from third-party vendors rather than develop them internally. This is happening in IT as it has and will in any industry.

We maintain here, that not everything in IT can be turned into a commodity and not every IT job can be offshored or outsourced. To illustrate this, we present a generic model identifying a boundary, called the *vendible line*, between the *strategic* regime and the *commodity* regime where jobs above the vendible line will never be outsourced or offshored and jobs below the vendible line may be outsourced or offshored.

Further, we analyze how the vendible line cuts across an enterprise, and we identify the characteristics employees must have to insure they stay above the vendible line. Given this insight, we suggest an IT curriculum that stresses these characteristics with the intent of producing graduates that are outsource and offshore proof.

2. IS IT A COMMODITY?

Carr in [2] and [3] has posited that all of IT is destined to become commodity-based and predicts companies will no longer need a Chief Information Officer any more than they need a Chief Electricity Officer. If this vision of the future holds true, then one day, indeed, there may not be any IT jobs for our graduates to have.

However, we feel that Carr's vision is limited for two reasons. First, the vision assumes that no future innovation in IT will occur. The United States leads the world in innovation and will continue to do so in the foreseeable future, especially in IT. There will always be a cutting edge in IT and jobs in that realm will not be outsourced.

Second, the vision assumes that everything in IT can be converted to a commodity-based market. This is the assumption we contest in this paper. In the next section, we present a generic model of enterprises defining two distinct regimes, one containing jobs and resources that cannot be commoditized and the regime containing those that can.

3. THE VENDIBLE MODEL

We begin by modeling an enterprise in terms of hierarchies as shown in Figure 1.

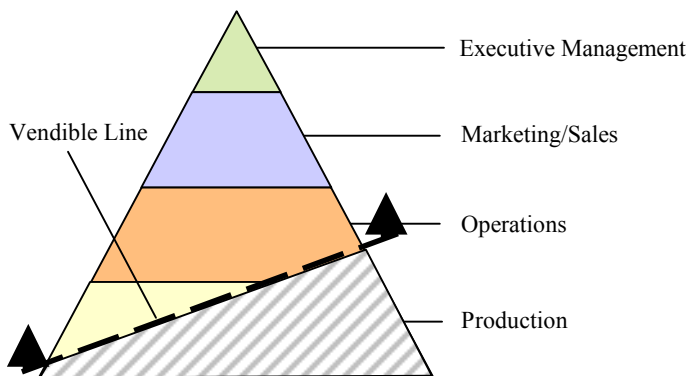


Figure 1. The Vendible Model depicts the *vendible line* partitioning an enterprise into a part that cannot be outsourced, called the *strategic regime* (above the line), and a part that can be outsourced, called the *commodity regime* (below the line).

The enterprise is depicted in a hierarchical fashion with the higher-valued positions (jobs with the highest salaries) near the peak and the lower-valued jobs near the base. In general, it is the lower-valued jobs in an enterprise that get outsourced and offshored first [10]. So, as an enterprise displaces more jobs, we can imagine a boundary, called the *vendible line*, separating the outsourced from the non-outsourced portions of the enterprise.

In general, as the industry matures, the vendible line sweeps upward through the enterprise claiming more higher-valued jobs. If the vendible line ever were to reach all the way to the top, the

enterprise would cease to exist. So by definition, if we have a viable enterprise, there is an intermediate vendible line.

The Holy Grail is the *virtual company* consisting of only a handful of senior executives in charge of a financially significant, completely outsourced, enterprise. Such a company would have a vendible line very near the peak.

Very few, if any, companies have no vendible line at all. Those would be companies that never purchase anything from other companies. Since almost every company buys something (e.g. consumables, raw materials, supplies, services) nearly every enterprise has an identifiable vendible line.

4. THE VENDIBLE LINE IN IT

We maintain that the same “vendible dynamic” described above is taking place in the IT profession. As more and more IT goods and services become commodities, enterprises are likely to outsource and offshore more IT jobs. Items like network cables, connectors, and disks have long since been commodities in the IT arena. A relatively new commodity is software development. However, the reality now is that programming skills are relatively easy to obtain and fairly widespread. The result is that the value of some software development jobs is falling below the vendible line and, therefore, falling prey to outsourcing (whether onshore or offshore). If we are to learn anything from history, analysis of other industries tells us that the trend is likely here to stay.

However, we do not believe the vendible line will sweep all the way to the CIO position as Carr would have us believe. The reason is that some knowledge in the company is proprietary business knowledge, critical to the identity of the company itself, and that knowledge cannot be substituted for by an outside vendor nor transmitted to an outside entity. Doing so would give away the company's competitive advantage.

In *Business @ the Speed of Thought: Succeeding in the Digital Economy*, Gates makes a strong case for the increased need for IT-savvy thinking to permeate all aspects of business [4]. He argues that without it, businesses will not remain competitive and not take advantage of the competitive levers provided by innovative state-of-the-art IT technology.

Because companies will always retain some proprietary strategic or critical business knowledge, and because more jobs in the company will become infused with an IT component, there will always be positions that stay above the vendible line. It follows then that IT jobs involving critical business knowledge are the kinds of IT jobs that will tend to stay above the vendible line. What are such jobs? [note: might want to reference the draft accreditation standard here since it lists probable IT jobs]

IT Executive Management

IT executive management is the decision making level for the company. These positions decide what IT will be applied and in what ways. They also continually seek new ways to apply IT to provide new strategic competitive advantage and positively impact the bottom line. Central to success in these roles is the critical business knowledge about how the company does what it does and why.

Business Analyst

These positions maximize the utility of IT by using IT infrastructure, information management, and knowledge management to extract the maximal amount of business intelligence from the corporate information corpus. Often, they are the ones who drive the need for an IT resource to be developed. For example, they may identify the need for a new report, a new database, or a new Web capability. They also are responsible for supporting IT executive management by synthesizing information needed to support business decisions. In this way, they are able to influence the direction of the company and are key in the formulation of corporate strategy.

Security

While some aspects of IT infrastructure security, for example, virus protection, may be outsourced, the whole of corporate IT security is not likely to be. Doing so, would essentially be like handing the keys to the business to someone else. Examples of emerging areas of IT security are *inferential security*, which seeks to protect a company's intellectual property from accidental disclosure via multiple legal avenues of access, and *semantic web security* which seeks to protect information assets in the future world of agent-based interoperability.

Research & Development

Some research and development can be, and will be, outsourced for financial reasons, but corporate entities relying on innovation to maintain a competitive edge will always retain a significant in-house R&D component. What a company invents itself is its lifeblood and this is true in the IT arena too. Even though companies may increasingly purchase IT commodities, there will always be the need for an enterprise to innovate on how they employ, utilize, and exploit IT resources.

Outsource/Offshore Management

While it is true that project management is sometimes being outsourced and these days, offshored, there must be a project management interface point for each of these external efforts. Ironically, offshoring and outsourcing create the need for management liaisons within the company. These positions require a dependence on, and knowledge of, IT, particularly Internet and communication technology, and therefore require personnel equally adept at management and computer technology.

IT Project Management

Regardless of the increasing trend to outsource projects and their management, it is unreasonable to expect that every project in an enterprise will be outsourced. In fact, resources freed by outsourcing and offshoring may result in more, albeit smaller, projects being undertaken in-house by more departments in the company. In any event, most projects any company is likely to engage will have an IT component.

Therefore, personnel may no longer be in an "IT department", but IT expertise will be needed throughout the company, especially in management roles.

Distribution/Logistics

Companies like WalMart and UPS have beaten competitors because of better distribution and logistics systems heavily reliant on IT technologies. As IT innovations increase, the need is likely to increase for trusted internal IT-savvy team members that will help spot and manage the implementation of new distribution and logistics systems.

Marketing

Determining the market position of a company is perhaps the single most strategic activity of any business. Those who work on the executive marketing team are laying out the strategic business position for the company. Getting outside counsel in this activity shows wisdom, but outsourcing the major decisions of the marketing activity is tantamount to declaring your business an apathetic or incompetent competitor—healthy companies cannot afford to do this. As the speed of information and change both increase, the need for loyal and trusted (internal), insightful, marketing-minded IT advisors will increase.

Sales

The executive management of sales channels is one of the most competitive activities of a company. The communication necessary to control and coordinate the activities of a company's sales channels require strong and updated IT skills and insights. The IT component of the executive sales function will increase as the pace of IT technology innovation continues to increase, and as the frenetic pace of competition in a global economy increases. The companies quickly taking advantage of IT innovations in this arena will have a competitive advantage over those who do not insuring the lasting requirement for integrated internal IT-savvy sales-team members.

Finance

Competent financial management is the fiscal and legal lifeblood of the company. Especially in a litigious society, the role of CFO is not likely to disappear by being outsourced. Although many bookkeeping functions may well be outsourced (security concerns aside), the legal constraints on CFOs are increasing as the sophistication of IT technology increases. Some recent examples of this are new federal regulations such as HIPAA for the health care industry, the Sarbanes-Oxley Act for all industry sectors, and the Gramm-Leach-Bliley Act. One common component of these new legal burdens is they all require significant integration with proprietary IT resources. So, we foresee the need for internal IT savvy finance-team members increasing, and not trending toward outsourcing.

5. THE NON-VENDIBLE IT EMPLOYEE

While we believe that not all IT jobs will vaporize in a puff of commodity buying, we also believe that the nature of the IT profession is changing and that a different kind of IT professional is needed in the workplace. Looking at the above list of non-vendible positions in a company, one notices that few of them are likely to be what we traditionally think of as “IT Department” jobs. However, more jobs in the company require IT competence of an advanced nature beyond common computer-user experience. Therefore, we see an increasing need for IT expertise distributed throughout the enterprise.

The key is *flexibility*. The non-vendible IT employee must be able to perform well in more than one position in the company [7]. Also, the non-vendible IT employee will increasingly find themselves in positions where the primary function of the job is not IT. Therefore, to maximize one’s utility, we feel one must take a multidisciplinary approach to academic preparation and career development.

This is not a surprise to us at the University of South Carolina Upstate. In the late 1990’s, a group of local business leaders communicated to USC Upstate the description of a different kind of graduate than USC Upstate has ever produced [ref if I can find one of the original notes]. Included in the requirements of this new kind of graduate were

- A solid understanding of computer technology
- The ability to communicate
- The ability to apply computer technology to a variety of different kinds of jobs
- Diversity in skills and the willingness to learn new positions

In short, local business told USC Upstate that, in addition to the deeply but narrowly prepared computer science major that USC Upstate had been producing, they needed a more well-rounded, broadly-prepared graduate capable of applying IT rather than developing IT resources.

Unknowingly, our corporate advisors were describing a non-vendible IT employee. In the few years that have passed, the needs of corporate America have not changed and a new dynamic, the outsourcing/offshoring phenomenon, has only underscored the need for such an employee, as we argue here [ref backing this up].

6. THE IMS PROGRAM

In response to the demand for a different kind of graduate, USC Upstate created the Information Management & Systems (IMS) program. IMS is a multidisciplinary IT program terminating in a Bachelor of Arts degree. The program is unique among IT programs because of its multidisciplinary nature.

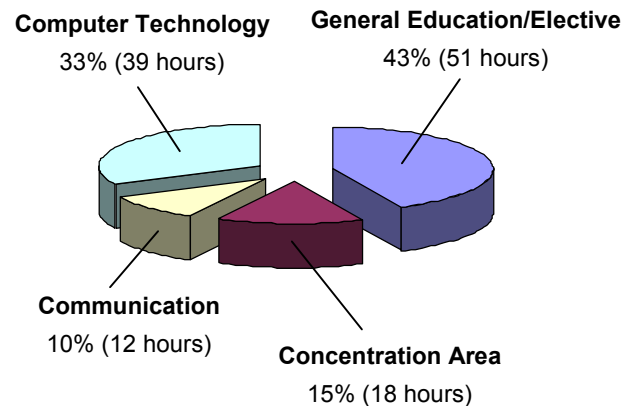


Figure 2. The IMS program at USC Upstate is a multidisciplinary program featuring a 120-hour curriculum comprising a nearly equal weighting of computer technology and non-computer technology courses. The communication and concentration courses improve a graduate’s chance to stay above the vendible line.

As shown in Figure 2, only about 1/3 of the IMS curriculum is dedicated to computer technology. Significant, is that 1/4 of the curriculum is dedicated to communication courses and one of four concentration areas (healthcare, business, education, and communication). The concentration areas reflect the job market in the region USC Upstate finds itself. These courses prepare graduates for a variety of jobs in these professions and can be considered the “applied IT” component of the curriculum.

The IMS program does not produce pure IT graduates. Rather, IMS produces professionals with a solid foundation in IT, but also with employable skills in a specific application area. This preparation not only increases the number of jobs the graduate is qualified for but also improves their flexibility and mobility within the corporation. This greatly enhances the chance of the graduate to remain above the vendible line and therefore, be outsource and offshore-proof in today’s changing job market.

7. RECOMMENDATIONS FOR SIGITE

One of SIGITE’s purposes is to define a model curriculum and accreditation standards for IT programs. A draft accreditation standard has been developed [8]. According to section IV-7 of the current draft, about 37.5% (45 hours) of a 120-hour curriculum should be dedicated to IT courses as shown in Figure 3. Section IV-9 of the draft standard states that the required subject areas taught within these 45 hours are to be: programming, networking, databases, and Web technologies. Section IV-7 states that the remaining 75 hours may or may not be in IT.

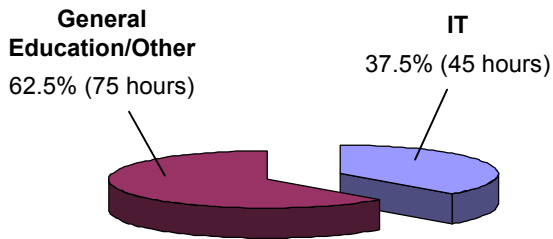


Figure 3. The current draft SIGITE accreditation standards for IT programs suggest 37.5% (45 hours) of the curriculum should be dedicated to IT courses.

7.1 Computer and Information Security

Discussion at the 2003 SIGITE conference (CITC-IV) revolved around the need to add *security* as a 5th subject area. There is tremendous market demand for computer security professionals and in this paper we have argued that security-related jobs are highly non-vendible. These two reasons compel us to suggest adding “Computer and Information Security” as a 5th required subject area.

7.2 Project and Business Management

Section IV-14 of the proposed accreditation standard states the curriculum must enable the development of project management skills. The analysis in this paper of non-vendible positions suggests that project management be given more emphasis because of its portability in the enterprise. We suggest adding “IT Project Management” as a 6th required subject area and specifying that this subject area include outsource management and offshore management.

While IT project management involves managing IT projects, analysis of non-vendible jobs in this paper shows more general business management skills and knowledge are important to enhance an employee’s portability. Discussion at the 2003 SIGITE conference showed that general business courses are already a staple in many IT programs. Therefore, we suggest that “Business Management” be added as a 7th required subject area.

7.3 Communication

Section IV-3 of the draft accreditation standards states that collaborative skills must be developed and applied throughout an IT program. Section IV-5 states that the ability to communicate orally or in writing must be developed and applied throughout an IT program. Based on our experience with the IMS program, the corporate community, and the non-vendible analysis in this paper, we feel that emphasis on communication skills should be elevated in the draft accreditation standard. The ability to communicate to upper management, development, operations, and outside vendors is crucial to success in today’s market and enhances one’s value tending to keep one above the vendible line. Therefore, we suggest adding “Communication” as an 8th required subject area.

7.4 Applied IT

Section IV-10 of the draft accreditation standards states that *all* students take additional courses beyond the core 45 hours to become an *expert* in one of the four core subject areas. While we do not object to a student becoming an expert in a narrow area, we argue in this paper that this may pigeon-hole graduates into technology-centric positions and therefore make those graduates more susceptible to outsourcing and offshoring. Instead of requiring all IT students to specialize in an IT topic, we suggest that this be rephrased to state that all IT students take courses in some “applied area of concentration.” This would allow those students who do want to specialize in IT to do so, but would also permit students to specialize in non-IT areas thereby increasing their marketability and flexibility in the enterprise.

The IMS program at USC Upstate achieves this in the form of an 18-hour concentration in healthcare, education, business, or communication. These concentrations include several courses especially designed for the IMS program. However, an easier mechanism might be to simply allow students to minor in some other subject area. This would prepare graduate students to seek non-IT positions, greatly increasing the number of jobs they qualify for and also improve their mobility within the enterprise.

7.5 The New Model Curriculum

Figure 4 shows our recommendation for a new model curriculum reflecting the additions suggested in this section. The IT Core contains courses for programming, networking, databases, Web technology, and security (2 courses each). The Project/Business Management section contains a combination of project management, IT project management, and general business management courses. The Communication section contains courses in interpersonal, organizational, and societal communication theory and applications.

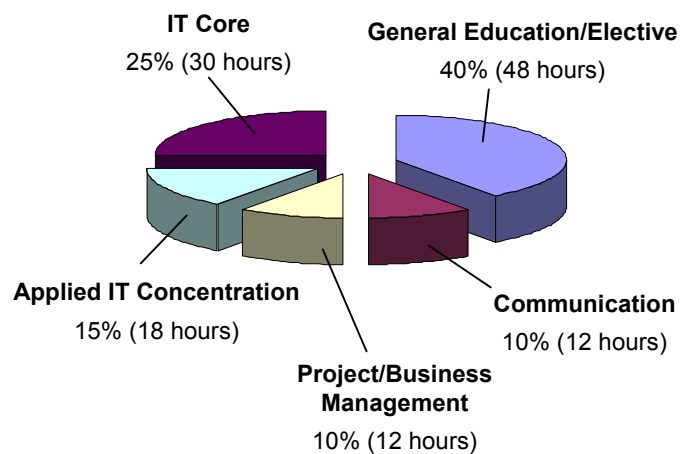


Figure 4. The proposed model IT curriculum adds security to the IT core, a communication core, and a management core along with the concentration area. This curriculum better prepares an IT graduate for today’s job market in which flexibility, mobility, and breadth of expertise is important to remain above the vendible line.

We feel that the proposed curriculum better prepares a graduate for the current job market. With pressures from outsourcing and offshoring, IT expertise is tending to become distributed throughout a company rather than being concentrated in a distinct IT department. As a result, an IT graduate's ability to perform in many different positions, including those where IT is not the primary job function, is crucial. By including significant communication, management, and applied IT courses, the proposed curriculum gives graduates a better chance to remain above the vendible line.

8. REFERENCES

- [1] Adamsky, H. How to Prevent Offshoring From Taking Your Job: A Guide for the Thinking Technologist. *Computerworld*, March 2004.
- [2] Carr, N.G. IT Doesn't Matter. *Harvard Business Review*, Vol. 81, No. 5, May 2003.
- [3] Carr, N.G. *Does IT Matter? Information Technology and the Corrosion of Competitive Advantage*. Harvard Business School Press, 2004.
- [4] Gates, B. *Business at the Speed of Thought: Succeeding in the Digital Economy*. Warner Business Books, May 2000.
- [5] Internet Website. <http://www.wordiq.com/definition/Commodity>. Accessed June 14, 2004.
- [6] Kenney, M., Florida, R.L. *Locating Global Advantage: Industry Dynamics in the International Economy*. Stanford University Press, 2003.
- [7] McMahan, S., Hudson, K. Offshoring and the Future of the U.S. IT Worker. Internet Website. <http://www.cioupdate.com/career/article.php/3116471>. December 4, 2003. Accessed June 14, 2004.
- [8] SIGITE Draft Accreditation Criteria Baccalaureate Programs in Information Technology. Internet Website. [http://www.sigite.org/uploads/Accreditation 4 Year 12.17.pdf](http://www.sigite.org/uploads/Accreditation%204%20Year%2012.17.pdf). December 17, 2002. Accessed June 14, 2004.
- [9] Thibodeau, P., Lemon, S. R&D Starts to Move Offshore: Outsourcing Evolves Beyond Low-Wage Programming Jobs. *Computerworld*, March 1, 2004.
- [10] Ware, L.C. Weighing the Benefits of Offshore Outsourcing. Internet Website. <http://www2.cio.com/research/surveyreport.cfm?id=62>, September 2, 2003. Accessed June 14, 2004.
- [11] Worthen, B. Your Risks and Responsibilities. *CIO Magazine*, May 15, 2003.