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Abstract

What will the future of U.S. based employment look like? The answer to this may lie in understanding the labor sourcing options that are now available to organizations. In this paper, we introduce a conceptual model that views automation, offshoring, and contingent labor as a portfolio of interconnected labor sourcing options within an organization. This paper makes three contributions to the literature on the changing nature of work. First, we delineate between technological complementariness and technological substitution to view automation as a true labor sourcing mechanism. Second, we show that the concurrent phenomenon of offshoring, automation, and contingent labor sourcing are interconnected when viewed from the perspective of a labor-sourcing portfolio. Third, we strongly posit that short-term profit maximization goals are the primary motivations for modern day labor sourcing decisions within organizations. We present a series of testable propositions and propose a research agenda for the labor-sourcing model.

Keywords

Automation, Offshoring, Contingent Labor, Human Resource Management

Introduction

"Don’t ever confuse the two, your life and your work. The second is only part of the first.”
Anna Quindlen, Villanova University 2000 Commencement Speech

Technology has transformed the nature of work across a diverse range of occupations; from factory workers to accountants, lawyers, doctors, and even service workers (Markoff 2011; Ellis 2013). This phenomenon has been enabled in part by the declining cost of technology and more specifically information technology. From 1850-2006 it is estimated that the cost of computer labor compared with human labor for tasks such as manual calculations decreased by a factor of 7.3 X 10^3; with annual price declines for computer technologies now averaging from 25 to 45 percent per year by the mid 2000’s (Nordhaus 2007, pg 144 and 128). To put this into perspective from the 1960’s to 1999, alone the cost of automated information processing technology had already fallen by 99.9% (Brynjolfsson and Hitt 2000, pg 26). This is even before the days of disruptive tech companies, widespread internet diffusion, and sophisticated mobile devices. These price declines coupled with exponential increases in technological capabilities have led to greater investments by industries in information technology and its artifacts over the last two decades. Information technology and its artifacts now substitutes and complements labor in many different ways (Autor, Levy, and Murnane 2003). This has initiated interplays between information technologies, organizational infrastructures, and labor (Bresnahan, Brynjolfssen, and Hitt, 2002; Caroli and Van Reenen, 2001). Competitive U.S. based businesses have noticed and taken advantage of this phenomenon.

U.S. based businesses are rewarded for maximizing profitability and decreasing costs (Freeman, Edward, and Parmar 2004; Sundaram and Inkpen 2004). One way this is accomplished is by utilizing less
expensive forms of labor and maximizing the productivity of current labor sources via technology. This has led to changes in the way that work is done in the United States (Lazonick 2013). Traditional full-time employment is no longer considered the default source of labor. Organizations are now operating in highly competitive environments where the greatest payoffs will come from the strategic interaction of technology with labor sourcing to obtain competitive advantages and enhance organizational performance towards profit maximization. This interplay between technology and the labor force has enabled new forms of labor sourcing which include automation, offshoring, and contingent labor. Businesses now have a portfolio of labor sourcing options in which to choose from; driven primarily by short-term profit maximization goals.

Within the management and IT literature streams, numerous frameworks, taxonomies, and classification methods have been proposed in regards to labor sourcing. Davis-Blake and Uzzi (1993) posited that the use of contingent labor by organizations was determined by some combination of employment costs, the external environment, organizational size, bureaucratization, and skill requirements. Ang and Slaughter (2002) proposed a taxonomy to address potential employee-sourcing strategies in the IT industry. The taxonomy from Ang and Slaughter (2002) positions insourcing and outsourcing as opposite points on a gradient scale of employee sourcing options; ranging from a traditional employee on one end of the gradient scale to a leased employee on the other end of the gradient scale. Autor et al. (2003) developed a task model which hypothesized that computer labor could not only complement but truly substitute for certain kinds of routine tasks. Youngdahl and Ramaswamy (2008) developed two conceptual models to understand the offshoring of knowledge and service work. The prior research however does not integrate the various labor sourcing options into one framework nor does the research independently posit short-term profit maximization as the primary driver of labor sourcing decisions in the United States.

In this paper, we introduce a conceptual model, which views automation, offshoring, and contingent labor as a portfolio of interconnected labor sourcing options. This conceptual model offers a more complete solution to studying the impacts of technology on the U.S. labor force and will help researchers and practitioners to more clearly understand the future of work as well as emerging trends in changing skillset demands, labor shifts, and job displacement. In this paper, we do not attempt to untangle the proverbial “black box” of labor sourcing decisions in regards to profit maximization. We do however provide some insight into the interrelatedness between the various sourcing mechanisms, and we layout a research agenda which can help to answer important questions regarding the future of work and labor sourcing.

Next, we present our literature review and conceptual framework.

**Literature Review and Conceptual Framework**

In this section, we present our conceptual framework of labor sourcing, along with our propositions. Our labor-sourcing portfolio builds off the notion that organizational information technology has interacted with organizational labor via complementation and substitution leading to job disaggregation. This job disaggregation can occur suddenly or over time, and leads to a proverbial “basket of tasks” within an organization that needs to be completed. This basket of tasks is associated with a single occupation within an organization, but tasks can also be sourced independent of a “complete” occupation. Disparate tasks can also be assigned to existing employees within the organizations, thereby widening the scope of their jobs. We posit that the labor sourcing decision will be driven primarily by profit maximization goals, which means that the organization will tend to choose the labor source that is most likely to decrease costs and maximize profits, especially in the short run. Organizations have two broad options when it comes to the sourcing of labor to complete tasks: they can insource the work to a standard full-time employee, or they can outsource the work to automation, to another country (in what is typically referred to as offshore outsourcing) or to another individual or organization located in the same country (this is referred to as contingent labor sourcing). Our labor-sourcing portfolio is noted in Figure 1.

**Profit Maximization**

The outsourcing literature describes two primary motivations for outsourcing labor: the resource dependency view and transaction cost economics. We briefly discuss these two theories and their shortcomings and introduce the notion of profit maximization as a primary motivation of labor sourcing decisions in the United States.
Ang and Slaughter (2002) posit that organizations may seek alternative sources of labor in order to preserve strategic resources and/or protect the organization from external environmental threats which may destabilize its operations. The conduit for the resource dependency view of labor sourcing is environmental buffering. Alternative sources of labor are viewed as flexible buffers, which can expand or contract to meet the changes caused by the external environment without affecting the organization’s core resources and critical dependencies. Based on the resource dependency view, organizations are likely to seek alternative forms of labor sourcing for those occupations that are not critical to the business needs and “where there is a lack of specific, needed information to effectively accomplish the work” (Ang and Slaughter 2002, pg 135).

Externalization and boundary setting are two theories that explain how firms create these flexible buffers. The externalization theory proposes that, as its permanent employees stabilize the organization, the organization may want to increase flexibility. Factors associated with the need for increased flexibility include the number of employees, especially in smaller firms; access to specialized skills in large firms; jobs that are cognitively complex; firm bureaucracy; internal labor markets, and hiring standards (Davis-Blake and Uzzi 1993). With the theory of boundary setting, researchers view the use of alternative sources of labor as a technique to proactively establish boundaries between the firm and the environment. Organizations may have a need to establish boundaries due to rapidly changing economic, demographic, and technologic trends. Changes in technology are especially disruptive within an organization due to the changing paradigms of time and distance (Johnston and Packer 1987). This may cause organizations to seek alternate sources of labor in lieu of full-time employees to manage work tasks caused by the changing environment.

Organizations must consider the true costs and benefits of labor sourcing decisions. There are characteristics of jobs and tasks that organizations must carefully consider during the labor sourcing decision process. Hence, transaction cost economics and other related bodies of theory have fundamental relevance in this topic. A large body of literature has already been established, examining questions related to the relationship between job characteristics and outsourcing (Azoulay 2004), and studies on IT-enabled outsourcing build on transaction cost economics to understand the determinants of contract design and outsourcing decisions (Mithas and Whitaker 2007; Susarla, Subramanyam and Karhade 2009; Susarla 2012).

The theories encapsulating the resource dependent view and transaction cost economics cannot account for certain phenomenon regarding labor sourcing. For example, while some research suggests that occupations which require increased levels of education are less amenable to alternative labor sourcing practices (Mithas and Whitaker 2007; Berman, Bound, and Griliches 1993), other research suggests that this is not necessarily true. Blinder (2009) concluded that there is no correlation between an occupation’s potential for offshore outsourcing and the occupation’s required level of education. Furthermore, offshoring and automation have had ambiguous or little impact on manual occupations (Autor, Katz, and Kearney 2006, pg 193); which are lower paying and require less education. In addition, organizations are increasingly outsourcing their research and development (RandD) functions offshore, occupations which

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**Figure 1 - Labor Sourcing Model**

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typically high educational attainment and correspondingly high wages (Manning, Massini, and Lewin 2008). Furthermore, non-routine analytic occupations such as management consultants are facing decreased levels of employment (Autor and Price 2013, pg 6; Beaudry, Green, and Sand 2013) despite increases in the U.S. labor pool and overall education level.

Noticeably missing from the IT and management literature are discussions regarding the financial motivations for utilizing alternative sources of labor. In the United States, the primary goal of publicly traded companies is to increase shareholder wealth, whereas for private companies the bonuses and compensation of full-time employees may be tied to meeting financial objectives such as cost efficiency (Lazonick 2013). Freeman et al. (2004) and Sundaram et al. (2004), posit that managers have incentives to maximize shareholder value; therefore they are likely to make decisions that will increase profits and decrease costs. The resource-based view and transaction cost economics cannot explain the motivation of firms that have met their needs but continue to seek alternate sources of labor.

**Proposition 1:** Motivated by short-term profit maximization goals, organizations are encouraged to perpetually decrease costs and increase profits, and will make labor sourcing decisions that will help them meet this goal.

*Disaggregation and the “Basket of Tasks”*

IT can complement and even substitute for labor within an organization. The interaction of information technology with organizational labor leads to the disaggregation of tasks, occupations, and even entire business processes. Autor et al. (2002) noted that as routine tasks within an occupation are automated this leaves a “basket” of disparate tasks from which managers can either create a “new” occupation or subdivide these tasks to the current employees. We use two theories to explain the disaggregation of jobs: the theory of global disaggregation; and the theory of business process outsourcing. The theory of global disaggregation views job disaggregation at the micro level and the theory of business process outsourcing views job disaggregation at the macro level. Both theories together are very useful in accounting for the job disaggregation phenomenon in the United States and are a causal mechanism for automation.

Job disaggregation that occurs at the broad organizational level is referred to as business process outsourcing. Business process outsourcing refers to the disaggregation of an entire business process from an organization. A business process may consist of many jobs and tasks within an organization. The standardization of business processes is the primary conduit for business process outsourcing. The outsourcing of business processes has many benefits, including reduced operating costs and increased innovation (Mani, Barua, and Whinston 2010). The combination of reduced operating costs, increased innovation, and the business process outsourcing itself causes dramatic changes to the organization’s remaining jobs and business processes.

These business transformations include reducing the size of firms based in the US, increasing the number of cross-functional jobs, increasing alliances, increasing colocation of employees, and further increasing standardization (Zenger and Hesterly 1997). In addition, an organization may create two classes of employees: permanent workers whose jobs are secure and pay well, and contingent workers who have sporadic, lower-paid work. These contingent workers have tasks that are well defined, whereas permanent employees tend to experience a widening in the scope of their jobs due to an increase in “one off” tasks that they are assigned (Ho, Ang, and Straub 2003; Ang and Slaughter 2001). Multi-faceted globalization concerns coupled with the need to find and maintain a sustained competitive advantage by focusing on core competencies led the manufacturing industry to the frontline of business process outsourcing (Quinn 1992; Mani, Barua, and Whinston 2010).

Job disaggregation can also occur at the occupation level, in what the literature has referred to as global disaggregation. The theory of global disaggregation was first proposed by Apte and Mason (1995) as a classification framework for a service occupation’s disaggregation potential. The framework concluded that the more an occupation can be disaggregated, the more likely it could be globally sourced in lieu of nationally or locally sourced. Factors that correlate with an increase in an occupation’s global disaggregation potential include information intensity, customer contact need, physical presence need, and average skill level (Apte and Mason 1995; Mithas and Whitaker 2007). Mithas and Whitaker (2007) concluded that the more information intensive an occupation, the more it can be codified, standardized,
and modularized. A result of global disaggregation is the decoupling of an occupation into front-end and back-end components; where the front-end is an occupation comprised of nonroutine tasks and the back-end is an occupation comprised of routine tasks. The back-end occupation can be sourced by offshored labor, but also by technology in the form of automation.

**Proposition 2:** Increased organizational investment in information technology increases the disaggregation of organizational labor at the task, occupation, and business process level, creating a disparate basket of tasks that needs to be sourced by labor.

**Proposition 3:** Employee sourcing will decrease over time as organizations utilize alternate forms of labor to complete tasks. Employee occupations will also become increasingly complex and broad across tasks, time, and space.

**Offshore Outsourcing**
Manning et al. (2008) defines offshore outsourcing as the process of sourcing any business task, process, or function supporting domestic or global operations to lower-cost, emerging economies. The literature on offshoring emerged from the broader research literature on outsourcing (Ang and Straub 1998). The offshoring of tasks has been facilitated by IT that has allowed firms to “trade” routine tasks to cheaper sources of labor (Tambe and Hitt 2012; Grossman and Rossi-Hansberg 2006; Mithas and Whitaker 2007). This has caused organizations to attempt to routinize as many tasks as possible. This routinization often takes the form of standardization. As standardization increases, the likelihood that the business process can be offshored sourced increases as well (Wullenweber, Beimborn, Weitzel, and König 2008). Furthermore, IT outsourcing, which includes offshoring, has been shown to reduce non-IT operating costs in firms (Han and Mithas 2013).

Offshoring not only has the potential to reduce costs, but can allow organizations to gain access to highly skilled talent from around the world. It was once thought that occupations that comprised the innovation processes of an organization were not susceptible to offshoring (Mudambi and Tallman 2010). However, U.S.-based companies are increasingly outsourcing functions such as engineering and research and development (Youngdahl and Ramaswamy 2008; Metters and Verma 2007; Jahns, Hartmann, and Bals 2006). The offshoring of traditional, high-skilled, U.S.-based jobs went from being considered a risky business decision to a routine one in many organizations (Manning, Massini, and Lewin 2008; Lewin, Massini, and Peeters 2009). Offshored labor possesses creative intelligence, interpersonal capabilities, and problem-solving skills equal to that of a full-time U.S. based employee. An emerging trend in offshoring is the accessibility to highly skilled, inexpensive labor by anyone, anywhere in the world, at any time, in the form of task-based workers due to the advent of task-based workforces facilitated by websites such as Upwork (oDesk and Elance as of 2016), Amazon’s Mechanical Turk, and Fiverr (Ghani, Kerr, and Stanton 2014; Amazon, 2014; Elance, 2014). The wages for most of these tasks are very low, amounting to sometimes much less than $1 per hour (Amazon 2014; Fiverr 2016) across a wide variety of tasks including appointment setting, sales calls, customer service, custom design work, and coding. Due to advances in communications technology, tasks of increasing complexity can be transported anywhere in the world to access the offshored labor force. Consequently, firms will continue to offshore as many tasks as possible.

**Proposition 4:** Offshored labor sourcing will increase for all occupations except those requiring physical touch-based interactions.

**Contingent Labor Sourcing**
If a job must be sourced onshore, contingent labor offers organizations reliability and flexibility; in addition to reduced labor costs (Davis-Blake and Uzzi 1993; Booth, Marco, and Frank 2000). Connelly et al. (2011) defines contingent labor as workers who have non-standard employment contracts, fixed term contracts, or precarious work arrangements. These workers are typically independent contractors, temporary workers, and part-time workers within an organization. Accenture estimated that as of 2013, contingent workers made up between 20% and 33% of the U.S. workforce. (Accenture 2013). The Bureau of Labor Statistics estimates that temporary workers alone are expected to increase by 24% between 2012 and 2022; encompassing a diverse range of occupations such as computer programmers, skincare specialists, cardiovascular technicians, maintenance workers, and statisticians (BLS 2015).
Over the last two decades, the use of contingent labor has gained widespread acceptance as a source of labor for many different types of skillset needs within organizations. Early contingent work was associated with lesser-skilled workers such as manual laborers, clerical duties and janitorial work, or to address labor and skillset shortages. Schilling and Steensma (2001) and Thompson (1997) argue that contingent workers are able to access new knowledge from technical innovations and use them for the organization’s benefit much more quickly than permanent employees. There has been a paradigm shift in which highly educated technical and knowledge workers are now being sourced for contingent labor (Oxford Economics 2014). Industries which traditionally had a high concentration of specialized or highly educated labor (i.e. financial services, healthcare, and public services) are more likely to now use contingent labor (Ettling 2014). In addition, within organizations occupations that were once considered integral to an organizations long-term well-being and security and safe from contingent labor sourcing are now being replaced by contingent workers (human resource specialists, inspectors, health support staff).

Due to technological advancements such as labor optimization software and remote workforce management strategies, organizations can view contingent labor as a form of inventory, ranging from hourly retail workers to high-end labor such as self-employed consultants. Similar to the methodologies used by just in time (JIT) manufacturers, where products are manufactured on an as-needed basis, employers can hire workers on a JIT-basis to meet their business needs (Kantor 2014; Lockwood 2014).

**Proposition 5:** Contingent labor sourcing will increase for all categories of labor, and will rival or exceed employee labor in many organizations and many categories of occupations.

Temporary jobs typically lack the job security, fringe benefits, and advancement opportunities that are available to permanent workers, thus making the contingent worker a cheaper form of labor than a permanent worker (Booth, Marco, and Frank 2000). Onshore occupations are more likely now than ever to be sourced by contingent labor. Organizations that have experienced rapid changes in their needs and labor requirements, most notably due to the need to quickly meet some type of organizational goal, will attempt to use contingent labor. Furthermore, in the context of offshore outsourcing, contingent labor can be a less expensive labor sourcing option over an employee if the labor requires face-to-face interactions.

**Automation as Outsourcing**

The literature prior to the mid-2000’s has been hesitant to explicitly claim that technological labor can substitute for human labor in complex tasks (Autor, Levy, and Murnane 2003). This is because technology had not yet emerged that provided evidence that this type of labor substitution was possible (Bresnahan 1999). However, there is increasing evidence that due to the advances in the field of artificial intelligence (AI), technological labor is capable of substituting for human labor in some complex tasks (Brynjolfsson and Mcafee 2013). Researchers previously believed that occupations that required finding patterns, communicating, making decisions or the ability to perform simple, but non-routine tasks were protected from automation, as they were more complicated to codify and therefore harder to automate (Bresnahan, Brynjolfsson, and Hitt 2002). As AI technology becomes increasingly sophisticated and the costs continue to decrease, it will become a more significant substitute for non-routine cognitive tasks (Frey and Osborne 2013; Brynjolfsson and MacAfee 2013). One such example is the use of emerging analytic capabilities on existing Web 2.0 content to unlock tacit knowledge. Researchers at Cornell University and the University of Maryland have both developed robots that can watch a large number of YouTube videos and pick up these patterns. Once these patterns are identified for a task, common steps can be derived, ordered, learned, and then executed by the robots (Griffin 2014; Epstein 2015). Brynjolfsson and MacAfee (2013) posit that technology labor will soon substitute for a significant portion of human labor.

Automation is also enabled in the form of technology enabled self-service mechanisms. For example, Progressive Insurance Company recently filed a patent in which damage to a physical possession such as an automobile or a home can be virtually illustrated, the claims event virtually recreated (from the perspective of the customer) and then an appointment could be scheduled to have the damage repaired (Nowak and Brylinski 2013). No contact is ever made with a claims adjuster and there appears to be no approval process by a human. This will clearly impact the demand for insurance claims adjusters in the future.
Proposition 6: Automation as a source of labor will increase as 1) technological capabilities increase and costs decline 2) organizations redesign business processes and 3) acceptability of “technology enabled labor substitutions” increases.

Research Agenda

In this section, we propose a research agenda based on our conceptual framework of labor sourcing. Our labor sourcing portfolio can be used to answer a variety of outstanding research question in the literature, especially questions at the broad organizational level. As novel datasets become increasingly available we will be able to answer some questions more quickly than others. Our conceptual model also presents an opportunity to revisit existing research questions in the outsourcing and automation literature. We propose the following broad research agenda:

1. Based on Proposition 1 and 2, what are the specific labor hour cost differences (by skillset) between automation, offshored labor, contingent labor, and an employee? When might an organization choose one labor source over another?

2. From proposition 3, what will be the characteristics of full-time employee labor in the next 10 years? What specific occupations will be strongly amenable to employee labor sourcing? How should individuals position themselves for a competitive advantage based on their inherent strengths?

3. From proposition 4, organizations are likely to be discreet regarding the use of offshored outsourcing and we may never hear about the jobs created and offshored at the organizational level. In addition, there are no longer industry-wide statistics on offshoring, making it difficult to quantify the characteristics of those jobs likely to be offshored. The capabilities of communication technologies are increasing. Furthermore, individuals are increasingly comfortable interacting with people from different cultures. With this in mind, does the notion that jobs that require face-to-face interactions and special people skills are less likely to be offshored still hold?

4. From proposition 5, organizations have argued that the increased use of contingent labor is due to skillset shortages and that contingent workers are better at managing work tasks caused by a changing environment because they have cutting edge skillsets and knowledge. Do contingent workers implement IT and research and development investments better than the existing employee labor, leading to enhanced performance?

5. From proposition 6, what are the expected impacts on the workforce as the capabilities of automation increase? Service and operations workers represent the overwhelming majority of workers in the United States, and service workers alone are estimated to make up 80% of the workforce (see Bureau of Labor Statistics 2015). Companies are now offering a myriad of technology based service and operations delivery options where users do not directly interact with employees (Curran, Meuter, and Surprenant 2003). Many of these technology-based service and operations delivery options are in the form of self-service technologies such as...
kiosks, websites, and intelligent phone systems. Despite this, there has been limited research regarding the impact of self-service technologies on the workforce. How has self-service technologies impacted the demand for labor? How will it change the employment prospects of service and operations workers?

**Conclusion**

A recent Pew Research Center survey shows that technology experts were evenly split on whether or not they believe technology will reduce employment opportunities (Smith and Anderson 2014). Based on the prior literature and our conceptual framework we know that offshoring has affected not only manufacturing workers but also such occupations as software developers and customer service reps. Technology has made it easier for employers to “trade tasks” from U.S. based labor to offshored labor (Grossman and Rossi-Hansberg 2006). It is estimated that about 2.9 million jobs have been offshored between 2000-2010 (Wessel 2011). However, some experts argue that this number only represents about 1/3 of the total job losses caused by offshoring during this period (Lach 2012). We may never know how many new jobs were truly lost to offshoring as new jobs are created and quietly sourced at the firm level. Current offshoring measures have focused on the shift of existing jobs to offshoring (see Farrell, et al. 2005). Technology has been integral to the development and management of contingent workforces within organizations; contributing to the increased use of contingent labor for occupations such as nurses, retail clerks, and warehouse workers (Kelly Services, 2014). It is now estimated that 1 in 3 jobs in the U.S. is contingent based (Ettling 2014; Accenture 2013). In addition, organizations have argued that the pace of technological innovation has led to a dire skillset shortage forcing them to utilize contingent labor to remain competitive. Regarding automation, to the best of our knowledge, there is no credible data on job loss due to automation. There is evidence that automation has shifted skillset demand and decreases demand for labor in general. However, when it comes to the potential automation of large categories of jobs, the current body of scholarship needs to look beyond the characteristics of individual jobs and consider the strategic context for firms’ decisions to invest in the technologies needed to automate various categories of labor.

This paper makes three important contributions to the literature. First, we explicitly delineate between technological complementariness and technological substitution and we posit that automation is a true source of labor within organizations. Second, we connect the concurrent phenomenon of offshoring, contingent labor, and automation in a theoretical framework that provides a more complete solution to outstanding research questions surrounding technology and labor. Third, we introduce the notion that labor-sourcing decisions are a function of organizations strategic management goals.

The discussion on this topic is not intended to be comprehensive, nor can it be. Rather, our intent is to open a broader discussion about other factors that have impacted the skillset demands of the U.S. labor force. The bodies of theory we considered have many potential connections with other bodies of theory not considered in this paper; they may all offer valuable insights into how information technology will continue to transform the labor markets.

**References**


