The Healthcare Off-Shoring Industry In Developing Economies – Institutional and Economic Foundations: An Indian Case

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Abstract:

Purpose– Industrialized world-based healthcare providers are increasingly off-shoring low-end healthcare services such as medical transcription, billing and insurance claims. High-skill medical jobs such as tele-imaging and tele-pathology are also being sub-contracted to developing countries. Despite its importance, little theory or research exists to explain what factors affect industry growth. The article's goals, therefore, are to examine economic processes associated with developing economies' shift from low- to high-value information technology enabled healthcare services, and to investigate how these differ in terms of legitimacy from regulative, normative and cognitive institutions in the sending country and how healthcare services differ from other services.

Design/methodology/approach– This research is conceptual and theory-building. Broadly, its approach can be described as a positivistic epistemology.

Findings– Anti off-shoring regulative, normative and cognitive pressures in the sending country are likely to be stronger in healthcare than in most business process outsourcing. Moreover, such pressures are likely to be stronger in high-value rather than in low-value healthcare off-shoring. The findings also indicate that off-shoring low-value healthcare services and emergent healthcare industries in a developing economy help accumulate implicit and tacit knowledge required for off-shoring high-value healthcare services.

Research limitations/implications– The approach lacks primary data and empirical documentation.

Practical implications– The article helps in understanding industry drivers and its possible future direction. The findings help in understanding the lens through which various institutional actors in a sending country view healthcare service off-shoring.

Originality/value– The article's value stems from its analytical context, mechanisms and processes associated with developing economies' shift to high-value healthcare off-shoring services.

Keywords: Healthcare off-shoring | Medical transcription | Tele-imaging | Tele-pathology | Outsourcing | India | Health services

Article:

Introduction

Industrialized country healthcare providers are increasingly off-shoring services such as medical transcription, billing and insurance claims to developing countries such as India. Tele-imaging (e.g. reading and interpreting magnetic resonance imaging (MRI), computed tomography (CT) scans and X-ray images) and tele-pathology (e.g. analyzing tissue samples) are some high-profile examples of medical functions off-shored by hospital managers in many industrialized countries such as Canada, the USA and Singapore (Blackwell, 2009; Pollack, 2003; Singh and Wachter, 2008; Stein, 2005). These actions have stimulated entrepreneurial activities in developing country healthcare off-shoring industries (Cases 1 and 2). Other high-value medical services related to clinical diagnostics as well as direct care, which can be digitized and/or monitored remotely, are candidates for off-shoring. Currently, services such as reading electrocardiograms and remote controlled robotic surgery are off-shored in vanishingly small amounts. Nonetheless, these areas also have a high growth potential. Cost-saving is a key motivating factor behind healthcare off-shoring's growth. Some Indian off-shoring firms, for instance, guarantee 40-60 percent medical billing savings. It is probably fair to say, however, that off-shored high-value healthcare service roots lie partly in a healthcare professional shortage in industrialized countries (Blackwell, 2009; Pollack, 2003). One estimate suggested that in 2002, 20 percent of US hospital radiologist vacancies were not filled (Expresshealthcaremgmt.com, 2005). Canada is estimated to have a shortfall of 600 radiologists. The average wait for a CT scan result in Canada is 70 days and for MRI it is over 90 days (Mackay, 2007). Likewise, in Singapore, patients in some hospitals wait two weeks to get their X-ray results. Off-shoring thus has the potential to make the best medical expertise available to patients without physical proximity to a doctor. Authors consistently suggest that most off-shoring arrangements involve technical experts at the home site and less experienced agents at the offshore site (Lacity and Willcocks, 2001). To the contrary, there are instances in which agents performing healthcare services in India are better qualified than US professionals; for instances, some Indian medical transcriptionists (MTs) are physicians. However, the same may not go for high-value healthcare services.

As noted above, from industrialized world-based healthcare provider standpoint, most off-shoring decisions are driven by cost-saving potential and addressing healthcare professional shortages. However, gaining legitimacy from various institutional actors such as the state, professional associations and consumers is equally important to off-shoring success. Medical

outsourcing is substantially affected by regulatory initiatives, philosophical opposition in the activist community, professional association standard setting and patients' concerns over quality, safety and information privacy (Singh and Wachter, 2008; Stein, 2005). Commenting on off-shoring to Indian radiologists, in a 2003 letter to the American College of Radiology, a Utah University medical resident complained that Indian healthcare off-shoring companies were "attempting to exploit the difference in salary between Indian and board-certified radiologists for commercial gain" (Tanner, 2004).

Institutional responses to healthcare off-shoring are broadly similar to those in other economic sectors (Kshetri, 2007). Labor union staff, for example, launched nationalist anti off-shoring campaigns. In 2006, Canada's Ontario Radiologists Association demanded the dismissal of the CEO of the Canadian Association of Radiologists for arguing in favor of offshore tele-radiology to solve Canada's radiologist shortage. Some activists philosophically oppose healthcare service off-shoring. For instance, the AuntMinnie.com radiologist discussion group framed foreign radiology services suppliers as "radiology sweatshops" (Pollack, 2003). Related to explanations based on institutional legitimacy, it can be argued that there are various interrelated reasons why institutional processes associated with healthcare service off-shoring and most other business process outsourcing (BPO) are likely to differ. More importantly, such processes also differ for low- and high-value added healthcare services. First, healthcare services take place in a regulatory environment that is highly complex (Singh and Wachter, 2008). For instance, unlike software programmers and call-center operators, US doctors dominate; they determine who can legally practice medicine (Friedson, 1970). Second, professional services performed by highly trained and licensed professionals such as radiologists and lawyers are known as extreme professional services, which rely extensively on tacit knowledge and long training periods (Singh and Wachter, 2008; Levy and Yu, 2006; Levy *et al.*, 2006). Critics have been concerned about overseas radiologist qualifications, training, licensing and accountability (Stein, 2005). Third, private insurers and government agencies, which reimburse payment for medical services, have their own concerns and agendas (Singh and Wachter, 2008). For instance, Medicare does not pay for out-of-country services. The final issue concerns negative country of origin effects associated with healthcare services, especially high-value ones, performed in developing countries (Lascu and Giese, 1995). Even if doctors are US-trained and licensed then convincing US patients that their X-rays can be accurately analyzed in India has proven to be a major challenge (Pollack, 2003). In light of these concerns, we examine three research questions:

1. What economic processes are associated with developing economies' shift from low- to high-value information technology (IT) enabled healthcare services?
2. How do low- and high-value IT enabled healthcare services differ in legitimacy from regulative, normative and cognitive institutions in the sending country?
3. How do healthcare services differ from other services in terms of institutional legitimacy issues?

Business process outsourcing is defined as long-term contracting a (client) firm's non-core business processes to an external (outsourcing) service provider. Medical outsourcing is defined as "the process by which a healthcare provider (whether an individual physician, medical group, hospital, or healthcare system) engages outside third parties to provide medical services" (Singh and Wachter, 2008, p. 1622). Medical off-shoring is a medical outsourcing special case in which

external healthcare service provider and patients are located in different countries. Telemedicine involves electronically delivering clinical or diagnostic medical services as well as information distribution (Wachter, 2006).

Table I. Indicators related to healthcare services in India and the USA

Variable	India	USA
Healthcare industry ($US)	35 billion	1.9 trillion[a]
Physicians (per 100,000, 2005)	60	256
Doctors graduating each year	27,000 (2008)[b]	35,000 (2006)
Radiologists	5,500[c]	30,000 (2003)[a]
Radiologist's average annual earnings ($US)	<35,000	275-300,000 (350,979)
Health imaging market ($US)	350 million	
Pathology laboratories	30,000	171,000
Medical transcription industry	$US 195 million (US$350 million for medical transcription and billing)	15,000 (2003)
Medical transcriptionist annual earnings ($US)	2,000-3,000	24,000-38,000 (entry level) 60,000-80,000 (experienced)
Medical transcription companies	254 (2002) 300 (2004)	
Medical transcriptionists	18,000 (2006) 20,000 (2007)[d]	102,000 (2000)

Sources: [a]Pollack (2003); [b]Bagchi (2008); [c]Steinbrook (2007) (active radiologists; a third have only paramedical training); [d]*Hindustan Times*, December 3, 2007

Table II. Activities that can be off-shored in the healthcare industry

Function	Explanation	Remarks
Low-value services		
Medical transcription	Converting medical notes dictated by a physician (voice files) into editable electronic documents (data files)	In addition to satisfying HIPAA requirements, digitization and better documentation provide a better defense for a healthcare provider
Medical billing/insurance claims	An offshore agent bills and collects professional fees for medical and healthcare services	Requires knowledge, insight, expertise and understanding of various healthcare issues
High-values services		
Radiology	Reading MRI, CT scans and X-ray images in an offshore location and reporting findings	In the USA, about 300 hospitals and two-thirds of radiology practices use tele-radiology services[c,e]
Clinical pathology	Tissue slides are diagnosed by an offshore pathologist[a]	Hospitals in about 27 US states used these in 2006. Indian and polish firms provide international telepathology[a]
Operations/surgery	Offshore surgeons perform robotic surgery using remote control[b]	Narayana Hrudalays, a Bangalore heart hospital, has plans to provide such a service
Intensive care units (ICU)	Monitoring intensive care units from remote sites[a]	Remote ICU service provider was reported to have 150 client hospitals[d]
Electrocardiograms (ECG)	Reading electrocardiograms - a recording of the heart's electrical activity over time is done in an offshore location	Bangalore's Narayana Hrydalalaya Institute for Cardiac Sciences analyzes 150 electrocardiograms daily for remote patients in India

Sources: [a]Pollack (2003); [b]Guglin and Datwani (2007); [c]Wachter (2006), Henkel (2006), Singh and Wachter (2008); [d]Henkel (2006), [e]Steinbrook (2007)

Indian healthcare off-shoring industry

Entrepreneurial activities in India's medical off-shoring related sectors are developing rapidly. Telemedical technology has allowed Indian healthcare staff to capture 2 per cent of the US healthcare market. Various indicators related to healthcare services in India and the USA are presented in Table I, which points to a relatively lower stock of healthcare professionals in India – both low-and high-skilled professionals – *vis-à-vis* the USA, Indian healthcare industry's relative size is even smaller.

Table II describes healthcare services that can be off-shored. The first two services are referred to in this article as "low-value added healthcare services" and the last five as "high-value added healthcare services".

Indian off-shoring industry for low-value healthcare services

Indian off-shoring sector medical transcription, medical billing collections and insurance claims are already substantial and are growing rapidly (Table I). India is the largest medical transcription services supplier to the USA and is ahead of its closest competitor, The Philippines. India is the most popular destination country for offshore service outsourcing involving health information for US federal contractors and state Medicaid agencies (Government Accountability Office, 2006). In 2006, India accounted for 78 percent of the offshore medical transcription market. While there are some large medical transcription service organisations (MTSOs) (e.g. CBay (Case 1 – see Appendix), Spheris, Spryance, Acusis and Heartland), most MTSOs are mid-sized (<500 employees) and smaller entrepreneurial firms (<50 employees). Mid-sized MTSOs tend to work as larger player franchisees or vendors and have limited marketing presence in the West. Smaller entrepreneurial firms, on the other hand, are mainly subcontractors to large and mid-sized MTSOs. The large players account for about 70 percent of Indian medical transcription off-shoring revenues.

The Indian off-shoring industry for high-value healthcare services

Off-shoring high-value healthcare services such as radiology and clinical pathology is rapidly taking off, commanding some attention. Indian companies such as Tele-radiology Solutions and Wipro provide radiology services for industrialized countries' hospitals such as the USA and Singapore (Pollack, 2003). Tele-radiology Solutions is probably India's most high-profile offshore radiology services provider (Case 2). The multinational Indian IT corporation Wipro, which has a big and growing physical presence in the USA, is another main radiology services provider in India for US hospitals. Wipro opened its healthcare division, Wipro Healthcare and Life Science, and in 2003 the company had 12 radiologists in India serving four US clients including Massachusetts General Hospital (Pollack, 2003). Wipro's Indian radiologists receive scans electronically and provide interpretations to US Wipro-employed licensed radiologists, who consult the client radiologist (Pollack, 2003). To read images generated in the USA, radiologists must have completed medical residency in the USA, passed US medical board examinations, be licensed in the patient's home state, have medical staff privileges at the patient's hospital, and have local malpractice insurance (Levy and Yu, 2006). Wipro's Indian radiologists do not satisfy these requirements and thus are not eligible to do even preliminary readings for US hospitals. Wipro radiologists are thus developing complementary services that help speed US-based radiologists' workflow (Stack *et al.*, 2007).

Understanding healthcare service off-shoring economic and institutional processes

Institutional factors in the sending country

Institutional theory is described as "legitimacy seeking" (Dickson *et al.*, 2004, p. 81). To gain legitimacy, organizations adopt behaviors irrespective of the effect on organizational efficiency (Campbell, 2004). Institutional influence on the off-shoring industry becomes an admittedly complex process (Dickson *et al.*, 2004) when organizations have to derive legitimacy from multiple sources such as employees, clients, client customers, local communities, professional and trade associations and governments. Scott (2001) proposed three institutional pillars – i.e. regulative, normative and cognitive – which relate to "legally sanctioned", "morally governed" and "recognizable, taken-for-granted" behaviors, respectively (Scott *et al.*, 2000, p. 238).

Regulative institutions and outsourcing

Experts argue that regulatory restrictions may limit off-shoring growth (Pollack, 2003). Privacy has been a major concern in offshore outsourcing decisions because of difficulties related to enforcing privacy laws in foreign courts. Some analysts argue that privacy rules are disguised protectionism. In 2005, there were anti-off-shoring bills to severely limit or stop off-shoring in nearly all 50 US states as well as in the US Congress. In 2004, Senator Christopher Dodd introduced the US Workers Protection Act, which prohibits federal funds for offshore work. In 2003, he introduced legislation to set restrictions on L-1 visas, which are used by companies to transfer overseas employees in the USA (*The Economist*, 2004). Critics were concerned about protecting patient privacy (Stein, 2005). Although outsourcing inherently involves issues related to quality, safety and privacy, off-shoring healthcare raises special issues (Singh and Wachter, 2008). Research also indicates that medical information sensitivity is positively related to perceived personal costs (Andrade *et al.*, 2002). Privacy concerns are more likely to be voiced in higher-value medical services such as radiological interpretations compared to medical transcription (Maher, 2004; Stack *et al.*, 2007). Experts argue that while many high-value healthcare services can be technically easily moved offshore, the trade barriers are likely to be higher than in back office services and manufactured goods (Levy and Yu, 2006). The medical industry legal system is evolving more slowly compared to medical technology development. An important barrier to employing offshore radiologists is that if a case is brought then the radiologist might not be subject to local jurisdiction (Weniz, 2007). Therefore, we propose the following:

> *P1a.* Anti-off-shoring regulative pressures in the sending country are likely to be stronger in healthcare off-shoring than in most BPO.

> *P1b.* Anti-off-shoring regulative pressures in the sending country are likely to be stronger in high-value healthcare off-shoring than in low-value healthcare off-shoring.

Normative institutions and outsourcing

Normative pressure is related to professional expectations. For instance, US healthcare sector managers may feel compelled to adhere to codes and norms developed by professional associations such as the American Association of Medical Transcription (AAMT), the Radiological Society of North America, the American College of Radiology, the American Board of Pathology, the American Academy of Professional Coders, and the American Telemedicine Association. The professional association's power to influence firms' behaviors is a self-regulation function such as conduct codes, licensing or certification (Campbell, 2004, p. 146; Dickson *et al.*, 2004, p. 83). A profession is self-regulated by an ethics code (Cohen and Pant, 1991), which requires members to maintain higher standards than required by law (Backoff and Martin, 1991). These conducts are "morally governed" and not necessarily "legally sanctioned" (Scott *et al.*, 2000, p. 238). As noted above, the medical industry legal system is evolving more slowly compared to medical technology. Ethics thus help fill the regulatory vacuum. Bangalore-based Tele-radiology Solutions employs US-trained radiologists to read scans for US hospitals but radiologists trained in India for hospitals in Singapore (Steinbrook, 2007).

The two-stage institutionalization process provides a helpful theoretical perspective for understanding processes associated with professional associations' influence on healthcare service off-shoring (Holm, 1995). At one level, professional associations such as the American College of Radiology exhibit conservative structures and engage in activities guided by an established institutional order (Greenwood *et al.*, 2002). At another level, however, these institutions also help create new or change old institutions (Holm, 1995). New institutional practices are thus built on older practices that "replace or push back pre-existing institutional forms" (Holm, 1995, p. 400). As to the latter role, institutional researchers came up with institutional entrepreneurship to examine how these actors create new institutions or change old ones. DiMaggio (1988, p. 14) notes that "new institutions arise when organized actors with sufficient resources (institutional entrepreneurs) see in them an opportunity to realize interests that they value highly". Institutional entrepreneurs are driven by some interests and are calculative.

Theorization or "the development and specification of abstract categories and the elaboration of chains of cause and effect" is an important process through which institutional entrepreneurs diffuse new ideas (Greenwood *et al.*, 2002, p. 60). Theorization provides rationales for adopting practices and thus increases the likelihood that practices will be accepted. Two key theorization elements concern framing and justification. Framing is concerned with the need for change and justification focuses on the proposed changes' value for actors (Greenwood *et al.*, 2002). We considered institutional entrepreneurship processes associated with creating anti off-shoring institutions (e.g. anti off-shoring opinion and legislation). The Ontario Association of Radiologists can be considered as institutional entrepreneur. Framing and justification needed for creating anti off-shoring institutions are relatively easier for medical services and especially for high-value healthcare services. For instance, compared to MTs, American radiologists argue more effectively that their Indian counterparts may lack tacit and implicit knowledge required to comply with high conduct standards required for that profession. Therefore, we argue that:

> *P2a.* Anti-off-shoring normative pressures in the sending country are likely to be stronger in healthcare off-shoring than in most BPO.

P2b. Anti-off-shoring normative pressures in the sending country are likely to be stronger in high-value healthcare off-shoring than in low-value healthcare off-shoring.

Cognitive institutions and outsourcing

Cognitive institutions are related to culture. The Indian medical transcription industry is more sophisticated than first meets the eye. Observers note that MTs in India take such jobs more seriously. While US MTs attend three to four months training, in India, they require about six months full-time training. They are also familiarized with specialized medical vocabulary and language. Firms in developing countries are taking several measures to maintain service quality. First, whereas US MTs typically have high-school level education, most Indian MTs have college degrees, often with medical science training. Second, Indian MTs are provided on-the-job training to decipher US medical terms. Medical transcription firms in India run three shifts a day and employ MTs with various skill levels such as general transcriptionists, proofreaders and "super-proofers". On the security front, studies conducted by Forrester Research and the UK's Banking Code Standards Board indicated that security standards in Indian call centers are among the best in the world, and that there were more security breaches in the UK and the USA in 2005 than in India.

It is argued that a well-rested radiologist in India may review X-ray images more accurately than a US-based sleep deprived one (Weniz, 2007). For example, the Bangalore-based Tele-radiology Solutions reported a 99.7 percent accuracy rate. From the developing world's perspective, what matters about local off-shoring industry growth is not simply healthcare service quality but how much effort they put in promoting their brands and how developed country patients perceive service quality. Perceived quality measures are "consumers' [subjective] judgment about a brand's overall excellence or superiority" (Zeithaml, 1988, p. 3). Product experiences, unique needs and consumption situations may influence a consumer's subjective quality judgment. Financial and healthcare information privacy is important to consumers. High value healthcare services such as radiology and pathology are more directly related to patient care and are performed by doctors (Pollack, 2003). A mistake could lead to potentially severe consequences. Despite lower outsourced healthcare service costs, consumers may not support such services if savings are traded-off with quality or safety (Singh and Wachter, 2008). Most developing country firms hold a relatively weak position in the value hierarchy (Heintz, 2006). The research literature provides abundant evidence about the country-of-origin (COO) effect. Prior research found that when brand names are not well known, COO becomes relatively more important in the evaluation. Lascu and Giese (1995) show that consumers rated a developed country more highly than a developing country in most areas except price. The fact that activities related to high value-added healthcare services supplied from developing economies are not yet taken-for-granted creates problems such as unstable portfolios, a lack of trust and economic inefficiencies associated with new roles (Stinchcombe, 1965). Consequently, we present following propositions:

P3a. Cognitive institutions (organizations with recognizable, taken-for-granted behaviors) in the sending country are likely to be less favorable to healthcare off-shoring than to most BPO.

P3b. Cognitive institutions in the sending country are likely to be less favorable to high-value healthcare off-shoring than to low-value healthcare off-shoring.

Developing comparative factor endowment in the destination country

We might detour briefly to discuss the distinction between codified/explicit and tacit knowledge. Codified knowledge can be shared without losing integrity. Tacit knowledge, on the other hand, exists in knowledgeable workers' minds, based on experience, expertise and skills. Tacit knowledge, thus, cannot be transferred without effort on both sides. However, the accompanying tacit knowledge is necessary if codified knowledge is used successfully (Patel and Pavitt, 1997). Some authors also use a third category, namely implicit knowledge, which lies between explicit and tacit knowledge (Griffith *et al.*, 2003). Leonardi and Bailey, (2008, p. 414) note:

> Implicit knowledge is not currently declarative like explicit knowledge, but, unlike tacit knowledge, could be made so.

Off-shoring low-value healthcare services and accumulating implicit and tacit knowledge

A top concern for a US-based client firm is that offshore agents may not be able to interpret the implicit and tacit knowledge embedded in artifacts (such as X-ray images) (Leonardi and Bailey, 2008). As call centers and their agents in a developing economy learn healthcare skills and gain experience, tacit knowledge accumulates. Put differently, the offshore producer can use simple work to build skills for more complex work. This process may, in turn, erode the sending country's competitive advantage (Levy and Yu, 2006). A lack of experience in US low-value jobs mean that US healthcare providers will not be able to preserve and increase tacit knowledge, which suggests the following proposition:

> *P4.* Off-shoring low-value healthcare services in a developing economy helps accumulate implicit and tacit knowledge required for off-shoring high value healthcare services.

Developing healthcare industries and accumulating implicit and tacit knowledge

Skilled healthcare professionals are now available in many developing countries. Research and development related export revenue in medical content and services was $US100m in 2003, which is expected to reach 300 million in 2010. Some Indian hospital staff set out to globalize their services to become truly worldwide companies with an international strategy. Consider, for instance, Narayana Hrudalaya, a Bangalore-based heart hospital. In 2004, the company had links with affiliates throughout India, Malaysia, Mauritius and Germany. The hospital's doctors see offshore patients' X-rays and angiogram results and consult using broadband. The hospital's future plans included providing robotic surgery by remote control. This is consistent with Bhagwati's (1998, pp. 20-1) kaleidoscopic comparative advantage theory, which argues: "[W]hat we are facing now is a new and steadily encroaching economic universe in which comparative advantage is becoming thin, volatile, kaleidoscopic and is creating vulnerabilities for industries, firms and workers. The competitive advantage margins have, therefore, become thinner. A small shift in costs somewhere can now be deadly to competitiveness. We used to call

such industries "footloose". In the old days, few considered such industries to be the norm. Today, they are the norm".

The basic idea behind kaleidoscopic comparative advantage is simple. As developing country healthcare industries shift into a higher gear, the industrialized world's comparative advantages may become thin and vulnerable. Several factors connect India's global linkage, which is pushing through a fundamental change in Indian healthcare industry. An estimate suggested that India received 450,000 medical tourists in 2007 (IndiaPRwire, 2009). India's private specialist hospitals such as the New Delhi-based Escorts Heart Institute and Research Centre market heavily in foreign countries. Estimates also suggest that the clinical research outsourcing market in India will cross $US10bn by 2010. There are about 60 accredited hospitals in India. Many serving medical tourists have links with US-based insurance companies such as Bluecross, Blueshield and Anthem Wellpoint. Such links help them develop implicit knowledge required for healthcare off-shoring. Off-shoring firms require knowledge, insight, expertise and understanding medical billing processes, health insurance company rules, benefit plans, medical procedures, relevant laws, billing systems and claims adjustment interface (Table II). Non-formal learning that occurs in the workplace helps to develop tacit knowledge, which is especially important when healthcare professionals are faced with unique or non-routine situations (Wyatt, 2003). In line with these arguments, we present the following proposition:

> *P5.* Developing healthcare industries in a developing economy helps accumulate implicit and tacit knowledge required for off-shoring high-value healthcare services.

Testing the propositions

The above propositions are tested by considering US institutional processes as the sending country and Indian economic processes in the destination country. Regarding *P1a*, in the USA, healthcare-related services are more protected than most other services (*The Economist*, 2004). There are specific laws that govern healthcare off-shoring. For instance, the 1996 Health Insurance Portability and Accountability Act (HIPAA) requires firms providing services to healthcare organizations (e.g. outsourcing vendors) to keep the information they receive confidential. The HIPAA covers several important areas in the healthcare regulation, from health benefits portability and claims fraud and abuse penalties, to electronic health benefits claims processing and beyond. The HIPAA created stringent information privacy regulations for individuals and information system security for healthcare professionals and organizations. Another challenging issue for international healthcare outsourcing companies may be related to payment. According to recent changes in Centers for Medicare and Medicaid Services (CMS) regulations, providers cannot seek Medicare reimbursement for services physically performed outside the US irrespective of whether the provider has a US license and certification (Singh and Wachter, 2008). Regarding *P1b*, additional regulations are being developed to restrict high-value healthcare off-shoring. In 2004, for example, two bills were introduced in the US Congress that limit radiology offshore outsourcing. Both bills required patients to give consent for radiology readings outside the USA.

For *P2a*, professional association staff raised concerns that are unique to healthcare service off-shoring. For instance, the AAMT raised documentation quality and patients' rights to privacy and

confidentiality arising from offshore transcription (Kshetri, 2007). Regarding *P2b*, to read images generated in the USA, a radiologist should meet certain requirements (Levy and Yu, 2006). In international tele-radiology arena, the American College of Radiology established standards that govern how US vendors engage and supervise tele-radiology providers (Singh and Wachter, 2008). The American College of Radiology Task Force on International Radiology endorsed continuing education requirements as well as fully disclosing board certification to patients and contracting parties (Singh and Wachter, 2008). The college also issued additional policy statements, which strictly prohibit "ghosting practices". This means that a US-based radiologist is required to carefully review and approve preliminary readings provided by offshore radiologists (Van Moore *et al.*, 2009). If a doctor refers an image to an uncertified radiologist then he/she may risk malpractice insurance (Levy and Yu, 2006).

For *P3a*, public concern has been heightened in off-shoring involving personal information, which seems to be more readily apparent in healthcare services. Fiske (2004) observed: 'The [healthcare] security issue is a valid one, and many people are concerned about it". Citing several patient data confidentiality breaches in off-shoring operations, Public Citizen, a US-based nonprofit consumer advocacy organization argued: "While […] privacy concerns unquestionably also plague outsourcing of government work to private companies in general, they are particularly problematic with regard to overseas providers" (see www.citizen.org/trade/off-shoring/privacy/). Likewise, Servais (2004, p. 12) noted: "Some conclude that using offshore transcriptionists could easily breach patient information privacy. There is concern that protected health information could be exploited, as was the case recently when dictation from the University of California San Francisco Medical Center was abused by a transcriptionist in Pakistan". Citing anecdotal medical transcription mistakes, the General Secretary of Unison Health Plan, the public-sector health care plans operator, forcefully noted that outsourcing is "a very dangerous practice" (E-Health Insider, 2006). Regarding *P3b*, today, accurately or not, many consumers associate developed-world based brands with higher quality than those from developing countries (Kshetri *et al.*, 2008). Developing country-based firms are largely regarded as basic value providers or as "unknown names on a box" (Hirt and Orr, 2006). Since off-shoring high-value healthcare services involves moving beyond providing basic value chain activities, providers based in the developing world are more likely to face branding problems in such services. Wipro's chief executive for health sciences commented that Americans are highly concerned about X-ray analysis in a third-world country (Pollack, 2003). This comment illustrates the branding problems specific to high value healthcare services.

For *P4*, medical transcription was among the "first wave" of IT-enabled service sectors developed in India (Gillard *et al.*, 2008). Some Indian IT companies such as Cognizant, Hinduja TMT and Ajuba Solutions entered into off-shoring low-value healthcare services. Wipro Healthcare and Life Science focused on low-valued healthcare services such as medical transcription and gradually moved to high-valued services (Financialexpress.com, 2005). The firms gradually expanded their off-shoring activities (Dossani and Kenney, 2009). Off-shoring-related behaviors may have self-reinforcing effects. Experiences may help generate externalities by making healthcare-related specialized inputs and services available, forming a specialized "labor market", and facilitating information, technology exchange and spillover (Marshall, 1920). Medical transcription-related activities help support specialization and co-ordination in other medical activities (David *et al.*, 2009).

Regarding *P5*, the Indian healthcare industry generated forward, backward and horizontal linkages, which helped accumulate the implicit and tacit knowledge required for off-shoring high-value healthcare services. For instance, Apollo Hospitals provide care for ten million patients from 55 countries annually. Modern facilities created by healthcare providers such as Apollo Hospitals have attracted Western-trained doctors. These doctors brought skills that improved Indian healthcare systems (Pafford, 2009).

Discussion, implications and conclusions

We have contributed to the field by integrating institutional and healthcare management literature to understand how healthcare industry idiosyncratic features superimpose in a complex interaction with economic and institutional processes to shape healthcare service off-shoring. We also analyzed how such processes differ for low-end healthcare sectors such as claims processing, medical transcription and high-end sectors such as medical analytics and clinical processing. To understand institutional and economic processes associated with developing healthcare off-shoring industry in developing economies, let us revisit three questions posed earlier. We found that a firm's off-shoring-related experiences in low-value services can have self-reinforcing effects. Such experiences may help generate externalities via various mechanisms. Our findings suggest that developing healthcare industries in a budding economy can generate forward, backward and horizontal linkages to accumulate implicit and tacit knowledge required for off-shoring high-value healthcare services. Concerning legitimacy from regulative, normative and cognitive institutions to off-shoring low- and high-value IT enabled healthcare services, our findings indicate that these institutions are less favorable for the latter services. Off-shoring high-value IT enabled healthcare services are governed by additional regulations, subject to more stringent professional requirements, and branding problems facing the providers based in the developing world tend to be bigger for such services. Finally, our findings demonstrated that off-shoring healthcare services generally face more severe institutional constraints compared to most other services. These can be attributed to inter-related factors such as a highly-complex regulatory environment in the healthcare industry (Singh and Wachter, 2008), doctors' professional dominance compared to other occupations (Friedson, 1970), and medical information sensitivity (Andrade *et al.*, 2002), which has important managerial and policy implications.

Implication 1: the lens through which institutional actors in a sending country view healthcare services off-shoring

We noted earlier that there have been various anti-off-shoring efforts. The need for change and the proposed change's value from pro-off-shoring opinion into an unfavorable attitude toward off-shoring appear to be more compelling for high-value healthcare services than for low value ones. However, protectionist measures against international off-shoring in response to the anti-off-shoring campaigns is also a function of whether it is viewed as filling gaps healthcare access (remote areas or during night and weekend) or competing with domestic providers (Singh and Wachter, 2008).

Implication 2: developing economies' need to slip into a higher gear

Doctor shortages and newly trained doctors' unwillingness and inability to see as many patients as in the past has been a pressing policy issue that adjoins American society's larger social and political concerns. This, compounded with increasing low-value healthcare service automation, points to developing economies' need to slip into a higher gear. The long-term competitive success after developing world-based off-shoring enterprises depends upon their ability to effectively translate tacit knowledge into improved business operations. Successfully attracting high-value healthcare services, however, also hinges on having a high-quality information and communication technologies (ICT) infrastructure. For instance, tele-surgery requires a dedicated fiber optic link, which guarantees connectivity and minimal transmission lag.

Implication 3: the US healthcare industry's IT adoption and assimilation

In IT spending and adoption, the US healthcare industry lags behind others in the USA as well as its competitors in other industrialized countries (Levy and Yu, 2006). As US healthcare industry organization staff intensify their IT adoption and assimilation, off-shoring healthcare services is likely to take off further. Previous research shows that cognitive legitimacy may improve with longer experiences. If Indian off-shoring firms consistently deliver high-quality medical services then negative COO perception effects may be overcome. Public relations (PR) efforts are also needed to ensure that various institutional actors in the sending country view medical service off-shoring as a solution to address healthcare professional shortages instead of causing job losses.

Implication 4: skill-biased technological change in the healthcare sector

Works involving non-tacit, codifiable knowledge or those for which a set of instructions can be provided and followed in an algorithmic way can be off-shored to low-cost locations. However, they can also be automated more easily (Maskell *et al.*, 1998). It is possible that technical progress will actually lower medical transcription service off-shoring. To put things in context, speech recognition software has automated medical transcription. More than a decade ago, Rosenthal *et al.* (1998) reported that speech recognition software decreased transcription time by 99 per cent, resulting in substantial cost savings. Consequently, transcription is more likely to be automated as speech recognition software improves. Similarly, partially automated proofreading is likely as spelling and grammar checking software improves. Editing, on the other hand, is likely to remain labor- and skill-intensive, offering advantages to nations with skilled editing workforces. These observations are broadly consistent with skill-biased technological change (SBTC) observed in most economic sectors. That is, technological changes favor workers with higher education and skill levels over those with lower levels. Skill-based technology in the healthcare sector stems mainly from ICT progress. Tacit knowledge, on the other hand, is less likely to be automated. Most medical images today are not recognizable by computers. Current computer algorithms, generally, do not accurately read electrocardiograms (ECGs) with electronic pacemakers (Guglin and Datwani, 2007). If computers can accurately diagnose X-ray images, then radiology work outsourced to developing countries is likely to be automated (Levy and Yu, 2006). Low-value healthcare services are more likely to be automated in sending countries than high-value healthcare ones.

Future research

In future conceptual and empirical work, scholars need to compare and contrast institutional pressures in high-value healthcare services with other types of professional services from the off-shoring standpoint. For instance, the professional expectations of radiologists and lawyers, professional self-regulation, established institutional order and efforts related to institutional entrepreneurship in their professions may differ. Future research might also examine how India's healthcare outsourcing competitive advantage differs from other services such as customer service, call centers, tax preparation, finance and accounting, human resources and design and engineering, etc. Further research is also needed to examine how India differs from its competitors regarding endowments associated with these services.

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