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Unraveling the Success of India's IT-ITES Industry: Can India Sustain This Success?

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Abstract:

In this paper we propose how India can sustain the success of its IT-ITES industry in the coming years. India has established itself as a global leader in the information technology-information technology enabled services (IT-ITES) offshoring industry. Different factors have been responsible for this success. While factors identified from the information systems (IS) and international business (IB) literature are adequate to explain the past success of India's IT-ITES industry, they are not adequate to explain whether this success can be sustained in the long run. This paper uses the endogenous growth theory and the economics of ideas to conclude that innovation and technological growth are keys to sustaining this success over time. The paper also highlights policy options that will harness innovation and technology growth in India.

Keywords: Offshoring, IT-ITES industry, endogenous growth theory

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INTRODUCTION

Information technology-information technology enabled services (IT-ITES) offshoring has played a significant role in providing measureable economic benefits for some developing nations, which has helped alleviate poverty in those nations. India, one such developing nation, has successfully created a thriving IT-ITES industry to become the global leader. Headlines highlighting Indian's economic growth from 2000 to 2010 abound in magazines and newspapers published around the world. The explosion of the services sector, especially the IT-ITES industry, has contributed significantly to this growth in the last two decades. As companies in the United States and Europe continued to outsource their IT-ITES operations, India benefitted from this industry trend. The Indian IT-ITES industry, which was practically nonexistent before the mid-1990s, has now become a major player on the world scene. National Association of Software and Service Companies (NASSCOM), the apex body of the IT-ITES industry in India, reports that the total revenue from the IT-ITES sector will grow to US\$76 billion (Figure 1), and direct employment by the sector is expected to reach 2.54 million by the end of fiscal year 2011. The revenue generated by the IT-ITES industry accounts for 6.4% of India's GDP, and India's share of the global outsourcing market stands at 55%, according to NASSCOM. Thoppil and Ahmed (2012) report that the industry is expected to expand approximately 11% to 14% in 2012. It is evident that India's IT-ITES industry has witnessed significant success and is the world's top offshoring destination.

The data in Figure 1 clearly indicates that India has successfully consolidated its position as the favored destination for IT-ITES offshoring. This research addresses the question: Can India sustain the success of its IT-ITES industry in the future? To answer this question we provide a multidimensional analysis of the issue using interdisciplinary research from the information systems, international business, and economics disciplines. The paper reviews the international business (IB) and information systems (IS) literature that help explain the factors that may have contributed to the success of the Indian IT-ITES industry. The main contribution of the paper lies in using the endogenous growth theory and the economics of ideas to address the issue of sustainability in the future.

The paper is organized in the following manner: the following section titled Research Foundation reviews the information systems and international business literature to identify factors that contributed to the success of Indian IT-ITES industry. The authors argue that these factors are not adequate to answer how India can sustain the success in the future. In the next section section titled Sustaining India's Success the authors borrow from the economics discipline to describe how theories in the discipline can be used to answer the research question that this study addresses. In the following section titled Applying the Endogenous Growth Theory to India's IT-ITES Industry the authors discuss how the endogenous growth theory can be used to sustain the success of India's IT-ITES industry. Specific policy options are provided. Finally, we conclude by providing direction for further research.

RESEARCH FOUNDATION

In the decade from 2000 to 2010 India emerged as the undisputed global leader as an offshoring destination. While the jobs in the IT-ITES sector were falling in Western nations, India's IT-ITES industry continued to explode (see Figure 1). As offshoring of IT-ITES services continued its growth in the United States and other parts of the Western world, it attracted the attention of researchers in information systems (IS). These researchers addressed myriad IT-ITES issues in the past decade. Haried and Dai (2011), in their meta-analysis and review of IS offshoring research

CONTRIBUTION

This paper makes a contribution to IS research in a multiple ways. First, this research looks at IT-ITES offshoring in India from a multidisciplinary perspective. To our knowledge, only a few limited studies in information systems (IS) address offshoring from a multidisciplinary perspective. Second, we believe that this is one of the first studies that not only identifies factors responsible for the success of India's IT-ITES industry in the past but also explores how India can sustain the success of its IT-ITES industry.

Third, this is the first IS study that explores the use of the endogenous growth theory borrowed from the economics discipline to explain the sustainability of India's IT-ITES industry. Finally, the authors use of the endogenous growth theory to help outline policy implications for India is a first in IS research. This research will be very interesting to researchers in IS as it will help them understand offshoring from a multidisciplinary perspective. Policymakers in India and global managers responsible for making offshoring decisions will benefit from the insights provided for their guidance.

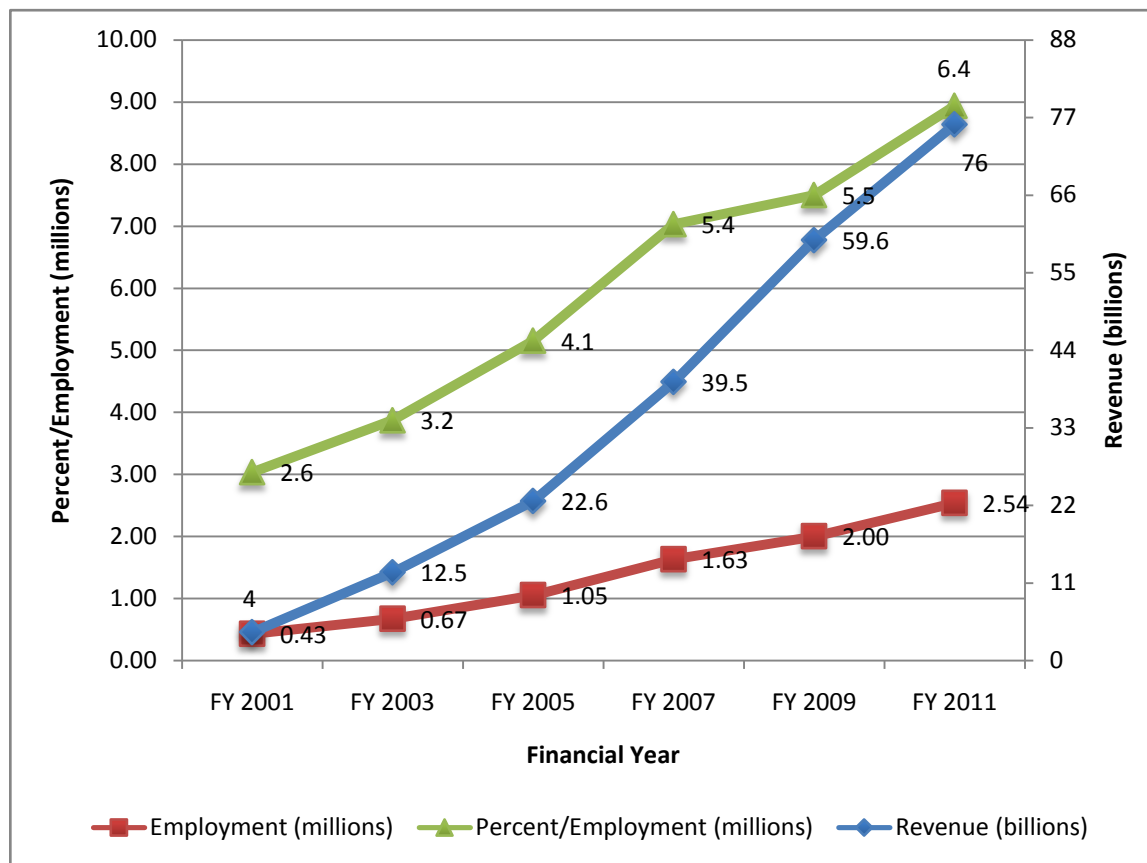


Figure 1: Growth of Indian IT-ITES Industry during 2000-2010
Source: NASSCOM

in the last decade, identified 24 different topics researched in 70 journal articles published in 12 leading information systems and management journals. In their study, they identified offshoring success as one of the top areas studied, with its popularity increasing with time. However, out of the 12 journals reviewed, only 2 journals, *Management Science* and *European Management Journal*, were from the management discipline. Sturgeon (2006), in his report on services offshoring, emphasized the need for “an interdisciplinary, collaborative approach to bring the complex and dynamic phenomenon of services offshoring into complete focus” (p. 40). Bunyaratavej, Doh, Hahn, Lewin, and Massini (2011) points out that though researchers have published extensively on this issue in past years, most of the offshoring research has been domain specific. Domain-specific research has investigated different aspects of the offshoring phenomenon in light of the particular interest of the discipline. Whereas research in information systems primarily focused on the needs of the IT-ITES industry to outsource in different parts of the world, researchers in international business, management, and economics have focused on the choice of locations, the basis of competitive advantages for companies, and comparative advantages for countries. This paper argues that IT-ITES offshoring is a complex phenomenon that demands participation of researchers from multiple disciplines to create new knowledge. We contend that the discipline of management, especially international business (IB), has a lot to offer and must be included in any study that focuses on IS offshoring. Hence this study reviews both the IS and IB literature to identify the offshoring success of India’s IT-ITES industry. We were cautious to include studies that span the decade when India emerged as a global leader in IT-ITES offshoring to ensure that the review does not ignore any part of the decade. Though not comprehensive, the factors are illustrative of what IS and IB researchers were studying, ensuring that this research is objective.

Scholars in both the IS and IB disciplines have identified factors that may have contributed to the success of India’s IT-ITES industry. These factors are: availability of human capital (or labor arbitrage); cost of labor arbitrage; ICT infrastructure; national culture (including language); trade policies and government regulations; the political, legal, and judicial system; government vision, policies, and incentives; political and economic risks; post-reform timing; market potential; and several miscellaneous factors such as quality of life, linkages, capital availability, and industry

characteristics.¹ These studies, although not specific to Indian IT-ITES industries, nonetheless are very relevant towards understanding the host of different factors that might have contributed to the success of that industry. However, it is also questionable whether these factors—as important as they may be in explaining India's success in the past—are adequate to answer the sustainability of such success in the future. Our paper contends that success in the future depends upon India's ability to move up the value chain in the IT-ITES industry. The threshold for sustaining the success in the long run is thus much higher than the requirements for initial entry and success. This paper contends that we need a different model to explain sustainability in the future, and the endogenous growth theory and the economics of Ideas serves as that model in this paper. Four critical factors contributed to the success in the past; however, these are now in need of a serious overhaul to sustain the advantage in the future:

1. As the demand for human capital increases in India, the supply is not able to keep pace. Further, the quality of the human capital is also becoming an issue. In a recent article published in *The Wall Street Journal* titled "India Graduates Millions, But Too Few Are Fit to Hire" (Anand, 2011) the author sheds light on the challenges faced by the Indian IT-ITES industry in recruiting quality employees for its offshoring operations. The article reports on a call center in India that was able to hire only 3% of applicants. Other studies (Surowiecki, 2007; Farrell, 2006b) have provided similar findings.
2. India needs to take drastic and immediate steps to improve its ICT infrastructure. As most of the IT-ITES industry was concentrated in a few urban areas during 2000–2010, it survived by developing the infrastructure in small pockets. As operational costs escalate in these urban centers, companies will have to relocate to second- and third-tier cities in the nation, necessitating the development of ICT infrastructure. At present, only 12.5 million people in India have broadband access, and the majority of Indians download data at 256 KB per second (Einhorn, 2011).
3. The advantage India had as an English-speaking nation is fast eroding as other nations are catching up. The English Proficiency Index (EPI) developed by Education First (EF) ranks China at 29, India at 30, Brazil at 31, and Russia at 32 in their 2011 report² on English proficiency in a nation. Malaysia, a potential offshoring location for Western companies came in at number 9.
4. Although India continues to be a politically stable nation, it needs to improve some aspects of its business environment. Business environment in India is still characterized by high levels of government red tape and corruption. In 2010, India was ranked 87th out of 178 countries for corruption prevalent in society. Corruption and excessive government regulation makes India still less competitive globally, as indicated by World Economic Forum's annual Global Competitiveness Index 2011-2012, where India was ranked 56th out of 142 ranked countries³.

Borrowing from the discipline of economics, we attempt to explain how India can sustain the success of its IT-ITES industry.

SUSTAINING INDIA'S SUCCESS

The static theory of international trade is based on comparative advantage. Comparative advantage of a country, in these models, is based on relative factor abundance and factor intensities. Thus countries will produce and export those goods that use more intensively their most abundant factor. The theory of comparative advantage explains the reasons behind the initial success of the Indian IT-ITES industry. Initially Indian companies provided IT services (coding and testing) that were labor intensive and allowed India to take advantage since India was relatively labor abundant. However, the theory of comparative advantage explains the direction of trade but does not explain economic growth. More important, it does predict that over time such comparative advantage may disappear and the direction of trade may be reversed. The competitive advantage India presently enjoys in providing low-cost, back-office services in the IT-ITES industry cannot be sustained in the future. To be competitive, India needs to move up in the value chain. The transition from providing low-cost services to providing higher-value products and services creates new challenges for the Indian IT-ITES industry.

So focusing on the theory of comparative advantage does not help us in explaining whether the success of the Indian IT-ITES industry can be sustained in the future. The literature on offshoring is replete with analysis of how

¹ See Wiener et. al., 2010; Doh, Bunyaratavej, & Hahn, 2009; Kedia & Mukherjee, 2009; Farrell, 2006a; Graf & Mudambi, 2005; Palvia, 2004; Carmel, 2003

² Source: <http://www.ef.com/~/media/efcom/epi/pdf/EF-EPI-2011> (higher ranks implies high proficiency, for example Malaysia with a rank of 9 has a higher English proficiency compared to China, India, Brazil, and Russia)

³ Source: <http://reports.weforum.org/global-competitiveness-2011-2012/>

offshoring improves productivity and profit for firms who are offshoring some of their activities. However, the literature on how offshoring improves the productivity of the supplier firms providing these services are scarce. That is the kind of analysis needed to focus on the future of the India IT-ITES industry. This paper uses the endogenous growth theory to analyze the impact of offshoring on the productivity of the Indian IT-ITES industry, and in the process analyze the evolution of the industry and ascertain its sustainability in the future. Specifically, this paper uses the endogenous growth model to analyze how the Indian IT-ITES industry, an intermediate-goods supplier, adapts new technology to increase its own profit and that of the client and stay competitive. Using the basic tenets of the endogenous growth theory, the paper develops a set of conditions and policy options for sustaining the success in the future.

The Endogenous Growth Theory

The use of endogenous growth theory as a vehicle to explain the sustainability of the Indian IT-ITES industry deserves a careful explanation. The main tenet of the endogenous growth is that economic growth takes place due to improvements in productivity. Improvement in productivity, however, comes from innovation and emergence of new ideas. The importance of knowledge and investment in human capital is thus a central theme of the endogenous growth theory. However, the idea that knowledge and human capital plays an important part in economic growth is not new. The importance of knowledge and investment in human capital have been stressed before, and we have two Nobel laureates in economics (Theodore Schultz and Garry Becker) who made path-breaking contributions to highlight the link between growth in human capital and economic growth.

What is unique about the endogenous growth theory, and hence its importance, is its ability to explain how growth rates can be sustained in the long run. In the past, economists could not explain the contradictions between what the theory predicted and what the actual data pointed towards. Economic theory predicted that economic growth rates among countries would converge as both capital and labor would flow to areas and activities where the returns were higher. This implied that capital would flow from rich countries (where the return on capital is lower) to poor countries (where the return on capital is higher). Similarly, labor would flow from poor to rich countries. In reality, that did not happen. Growth rates among countries did not converge, and prediction about the flow of capital and labor along those lines also did not materialize.

Endogenous growth theory explained the inconsistency by arguing that the source of new ideas and innovation is not external (as the classical and the neoclassical economy assumed) to the economy but very much internal. Romer (1994) stated that “economic growth is an endogenous outcome of an economic system, not the result of forces that impinge from outside” (p.3). If the key to sustainability is innovation, then the crucial question is what drives innovation. According to the endogenous growth theory, innovation is a social process that crucially depends upon the interaction of technology and business environment. Innovation is helped by society’s ability to harness and advance knowledge that it already possess, its ability to learn from each other, its ability to conduct research activities with few duplications, and its ability to reward innovation by allowing extraction of economic rents from innovation. Thus, in the endogenous growth theory, knowledge is assigned a central part as a determinant of economic growth. Knowledge is an asset, which is subject to increasing returns since it has generates positive externalities and positive spillover effects.

By making the process internal, the endogenous growth theory, for the first time, made economic growth a function of the domestic policy initiatives. Thus the rate of growth rate can be influenced and sustained by designing appropriate incentives structures for both the private and the public sector. The endogenous growth theory has policy implications that are crucial for long-term sustainability of the Indian IT-ITES industry. The section that follows lays out the formal model and the policy implications that emerge from that model.

Formal Endogenous Growth Model and the General Policy Implications

Specifically, this paper draws on Romer’s (1990, 1994) endogenous growth theory and the economics of ideas to offer possible solutions for sustaining the success India achieved in its IT-ITES industry. In the standard growth model, Solow (1956) uses a Cobb-Douglas production function of the type $Y=K^\alpha [AL^{(1-\alpha)}]$, where K is capital, L is labor, and A is the technology, which is assumed to be labor augmenting. In his model, Solow (1956) did not explicitly model technological progress but assumed it was exogenous. In Romer’s (1990) model, the production function is the same as in Solow’s model but instead of assuming A is exogenous, A is endogenous. A is made endogenous by incorporating the notion of “ideas” and how they are formed. The central characteristic of “idea” is that it is nonrivalrous, partially excludable, and its production is characterized by increasing returns to scale. In his model, Romer (1990) uses the following functional form to model ideas:

$$\dot{A} = \mu L_A \tag{1}$$

Where \dot{A} is the number of new ideas produced at any given time, L_A is the number of people trying to discover new ideas, and μ is rate at which they discover new ideas. However, the rate at which new ideas are discovered is a function of the stock of ideas already discovered.

The simplest form of the rate at which the economy discover new ideas is given by

$$\dot{u} = \mu A^\varnothing \tag{2}$$

In this case, we have three possible scenarios: (i) $\varnothing > 0$ indicates that the rate at which new ideas are discovered increases as the stock of ideas already invented increases, (ii) $\varnothing < 0$ indicates that the rate at which new ideas are discovered decreases as the stock of ideas already invented increases, and (iii) $\varnothing = 0$ indicates that the rate at which new ideas are discovered is independent of the stock of knowledge already invented. Using an aggregate research function leads to

$$\dot{A} = \mu L_A^\lambda A^\varnothing \tag{3}$$

In this case, λ incorporates the effects of duplicative research. For example, if $\lambda < 1$, it indicates negative externalities associated with duplication.

Along the balanced growth path, $g_y = g_k = g_A$, where per capita growth rate of output g_y and the growth rate of the capital labor ratio g_k and the growth rate of the stock of ideas g_A must be the same. Thus in this model, in the absence of technological progress, there will be no growth.

Also, along a balanced growth path $\dot{A}/A = g_A$ is constant. Taking log on both sides of the aggregate research function and taking derivatives yield us

$$0 = \lambda \dot{L}_A/L_A - (1-\varnothing) \dot{A}/A \tag{4}$$

If we assume that along the balanced growth path the number of researchers must grow at the rate of the population growth rate, so $\dot{L}_A/L_A = n$

From equation 4, it can be derived that

$$(1-\varnothing) \dot{A}/A = \lambda L_A/L_A \tag{5}$$

This implies that

$$g_A = \lambda n / (1-\varnothing) \tag{6}$$

λ depicts the effects of aggregate research efforts, and n is the growth rate of researchers.

Thus, the rate of growth of new ideas is a function of (i) the growth rate of researchers, and (ii) the externalities associated with duplicative research, λ , and (iii) whether the productivity of research is an increasing function of the stock of ideas already discovered, \varnothing .

As is clear from equation 6, higher population growth rate increases the likelihood of higher growth rate of researchers. If we assume that a fixed percentage of the population will be engaged in research activities, then with an increase in population growth rate the number of researchers will also increase. This is counterintuitive but a powerful conclusion that emerges from the endogenous growth theory.

The value that \varnothing and λ assume has significant policy implications. g_A is higher if $\lambda > 1$, (i.e., there are positive externalities associated with research efforts, or less duplication in research). Finally, the growth of new ideas g_A is higher if $\varnothing > 1$ or if the rate at which new ideas are discovered increases as the stock of ideas already invented increases.

A convincing case can be made for adopting a set of policies options that (a) encourages research efforts and (b) encourages diversion of resources towards coordinated research efforts that build on existing research. These two

sets of policy options can be very instructive for the Indian IT-ITES industry. Indian IT-ITES industry has evolved significantly over time. Whereas the initial focus of the IT-ITES services was to provide simple services such as coding and testing, it has now morphed into much more challenging jobs such as managing the entire supply chain operations for major American multinationals. This evolution can be largely attributed to improvising on the existing body of knowledge and experience that these firms gained over time from their offshoring services. However, public policy designed to coordinate these experiences and learning is largely absent in India. The same can be said about duplication of research efforts. Public policy designed to allow diffusion of research efforts and avoid duplication of research is also lacking in India.

APPLYING THE ENDOGENOUS GROWTH THEORY TO INDIA'S IT-ITES INDUSTRY

For the success of the IT-ITES sector to be sustained in the future, the economy must create an environment that encourages the development of new ideas. Endogenous growth theory predicts that the growth of new ideas will increase if there is an increase in the numbers of researchers, if there is less duplication of research efforts, and if the current and future research can be made a function of the stock of ideas already invented. Indian public policy can play a decisive role in this regard. The principles of the endogenous growth theory can be applied to the Indian IT-ITES industry to see how the transformation can be achieved.

1. Strict enforcement of the Intellectual property rights, which would allow the inventor of new ideas to extract economic profits from the substantial investment in new ideas. Enforcement of intellectual property rights would foster innovation. Guarantee of Intellectual property rights will encourage business development and innovation since it provides the innovator a short-term monopoly on his innovation and thus the ability to extract some profit. This in turn will increase foreign direct investment (FDI) and transfer of technology that generates positive externalities for home-grown research. In addition, the enforcement of intellectual property rights does spur domestic research, since adoption of external researches is now more expensive.
2. Allow strategic clusters of imperfect competition or monopoly practices to enable firms in the short run to charge a price higher than marginal cost. Private business will invest in new ideas only if they can extract profit from that investment. However, there are two important problems regarding investment in new ideas. First, once an idea is formalized, it is very difficult to exclude someone from its benefits. This is the “free-rider” problem, where it is difficult to charge a price for the new idea. Thus the social benefit of new ideas is often larger than the private benefits of new ideas. Second, new production ideas often mean substantial investment. Once an idea is formalized, it is very inexpensive to mass-produce the products that the idea helps create. Thus, production of new ideas is often characterized by increasing returns to scale. This dual problem—that ideas are expensive to create and the benefits difficult to extract—discourages investment in new ideas. It requires government intervention to create an environment in which the investors can justify their investment. Once the idea is standardized, the policy should be more deregulation to foster more competition and thus more innovation. In the case of endogenous growth model, imperfect competition seems to have a positive impact on growth by allocating resources in R&D that would not happen in the absence of market power and the ability to control price. R&D intensive firms have to cover their R&D expenses out of the operating revenues. Growth is higher in more concentrated markets, provided the concentration is not exorbitantly high (Smulders and van de Klundert, 1995). Public policy thus has a role in accepting and encouraging such limited market power to enhance R&D spending. The increase in R&D spending generates positive externalities that have the potential of affecting companies beyond the company making the R&D investment.
3. Encourage strategic public-private partnership and cooperation among competing firms to share the burden of the initial high cost of new ideas. The public-private partnership should focus on two aspects of the partnership that are critical for the long-term success of the Indian IT-ITES industry. First and foremost, the partnership should focus on ways of reducing the risk of investing in R&D by having some significant part of the investment made by the public sector. Second, it should focus on how the benefits of that investment can be effectively harnessed for the society at large without compromising the profitability of the original investor. If the cost of innovation can be shared, the need to charge a monopoly price would be reduced significantly and the benefits of innovation can be distributed more equitably. The Indian government and the Indian IT-ITES industry need to form a strategic partnership such that both objectives of the partnership are met. This can be achieved by forming the partnership in a way that allows the private investor to receive a reward for that investment that is proportional to an objective measure of risk assumed by the private investor and also a management role of the private investor proportionate to the risk of the private investor (Becker and Patterson, 2005).

4. Encourage diffusion of research, which often means funding of coordinated research in private and public sectors and universities. This accomplishes two main recommendations of the endogenous growth theory. First, it reduces duplication of research efforts. Second, it increases research efforts that are often a function of the stock of research that already exists. This is a function not only of how effectively an existing body of knowledge can be retained and improved upon to move up the values chain but also the incentives that government policies provide for acquisition of such knowledge. Thus investment in R&D and any policy measures that provide incentives to increase R&D spending are bound to have a positive impact on economic growth. The same can be said about any specific industry. The body of knowledge that is already endowed in the Indian IT-ITES sector needs to be transformed to help the industry move to a higher plane for them to be viable in the future.

CONCLUSION

This paper uses the IS and IB research to identify factors (e.g., low labor cost, skilled human resource, English as a medium of instruction, high public investment in education, open trade policies adopted in the 1990s, and relatively low political risk) that contributed to India's success in the IT-ITES industry. This paper argues that all these factors, responsible in explaining India's success, cannot be relied upon to sustain this success in the long run. To sustain this success in the long run, India must ask two key questions: (1) how do we foster the innovation of new ideas, and (2) what are different policy options available to foster innovation? The endogenous growth theory gives us a framework to tackle both questions. This paper concludes that effective government policies in four key areas can be of significant help in sustaining the successes of the Indian IT-ITES industry in the long run. Popkin and Iyengar (2007) write about technology innovation moving westward over the last two centuries, arriving in India and China in present times. As a result, India is currently experiencing an economically prosperous era, and history indicates that this may not be the best time for enduring change. The critical question is whether India can, amid its IT-ITES services industry boom, avoid the "halo effect" and address the challenges that it faces to ensure sustained success. However, without the right policies in place, technology and innovation may continue their westward march after a short stay in India. The hope behind this paper is for future research to see and appreciate the value of interdisciplinary research to answer important questions related to the offshoring phenomenon.

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