Study of Factors Affecting Software Services Exports in India and its Performance Since 2010

Pradeep Kumar and Syed Shahid MazharP
Department of Commerce, Business Management, Integral University, Lucknow, India
joinpkumar@gmail.com; shahid.dphil@gmail.com

[Abstract] Nowadays, the software industry is very useful in our economy. It has a pivotal role in supporting the government. It is an important medium to support the growth of Indian exports. In software, India has developed a significant brand value throughout the years. In software-enabled services, India is developing as a standout among the most favored goals for business process outsourcing. This study evaluated the performance and growth, factors affecting services exports, and the problem faced by the software industry about the problems in promoting the exports. This study begins by examining India's software export experiences and creates a new "Software Export Success Model." There are several applications for this paradigm, which was developed as a descriptive framework. It offers a normative framework from which ideas for the policies and measures these countries would need to be taken to boost software export growth. This research not only highlights the importance of this new framework for conceptual analysis, but also illustrates how consultants, legislators, and other stakeholders in software sector strategy may find it useful. Although it is not the focus of this article, it appears that the model will also serve as a basis for comparable study and assistance for the several following nations that have lately entered the software export market.

[Keywords] software industry, export, factors, performance, India

Introduction

India is thought to be the leader in the information technology sector. Due to the success of the Indian software industry and the commitment of its citizens at the beginning of the American software revolution, this is vital. It is a proven truth that during the past ten years, the country's software market has grown at an astonishing pace of 35% annually. This supports the idea that India is a top software producer. In the meantime, India remains a poor nation both for per capita income and the human development index. According to the 2004 Human Development Report, India is among the nations with most exceedingly terrible incongruities between their genders related index and the Human Development Index (HDI) values.

In software, India has developed a significant brand value throughout the years. With software-enabled services, India is quickly rising to the top of the list of most popular locations for business process outsourcing. The significance of software to India's economy may be determined by the fact that it increased from 0.6 percent of the GDP in 1994–1995 to 4.3 percent in 2004–2005, a seven-fold increase over the course of only one decade. Industry statistics don't directly correlate with GDP, but they do indicate the growing importance of software in the country. Expecting that Indian economy and the software segment will repeat their previous six years of growth in the next six years, it must be considered that the worth, of the software area is two-thirds of its business income. The national GDP will be about 8.5 percent between 2010 and 2011, exactly the same as it is in the United States right now, 6435 billion rupees in 2010-2011, up from 1276 billion rupees in 2004-2005; the IT segment revenue must improve. There are two aspects of the software industry concentration (Heeks, 1999): 1) Market served: sales to international and/or local markets and 2) Output type: software products and/or service sales.

Additionally, for the following countries, the advantages of software exporting seem to outweigh those of the domestic focus. Entry into exports faces more obstacles than entry into domestic sales. Since software exports are frequently a virtual enclave activity with little advantages that filter down to the poor, they can potentially worsen disparities. In terms of income/productivity per person, profitability, gains in foreign exchange, and knowledge infusions that may accompany international operations, software exports offer larger overall benefits for development according to Heeks and Grundey (1996), Correa (1996), Arora

and Athreye (2002), (2004).

India's IT services and software sector is more robust than its hardware counterpart. India has emerged as one of the most popular destinations for sourcing software. Between 2004 and 2005, the combined revenue from software administration and software decreased by US$ 22.2 billion, of which US$ 17.3 billion was generated through travel expenses. In comparison to competitors like China, Philippines, Ireland, Australia, Canada, and so forth, India ranks highly in a variety of categories, including cost effectiveness, linguistic proficiency, project management expertise, and overall quality assurance.

The IT management and software sectors make up a large portion of the Indian software industry. By comparing time zones, India can provide 24x7 service and shorten turnaround times. This is plausible given India's unique geographic location. The software sector of the industry is growing quickly and is becoming one of the nation's primary investment areas. This portion produced income of US $5.7 billion in 2004-05, represents a development of 46% over the earlier year. Apart from 90% of income created through fares, there has been enormous development in the household market, also. The extent of the residential business sector in the software sector expanded from US $300 million in 2003-04 to US $600 million in 2004-05. The hardware portion of the software business in India has not demonstrated the same level of advancement as experienced by ITES and software.

It is right that the equipment fragment of the software business has not gotten any sort of government backing by its different partners. The fabricating of semiconductors and other complex hardware parts regularly requires a foundation, a vast scale interests in limit, and collected experience that India does not have and is not able to get effectively (Singh, 2002). In any case, India performs various hardware assignments inside, totally for the household market. Hardware segments are commonly foreign made from Southeast or East Asian nations. Just like the case with a few East Asian nations, it is additionally feasible for India to change its capacity from constructing agents of complex segments created somewhere else to making equipment through learning by doing. Configuration of equipment normally includes improvement and utilization of proper programming codes. Equipment could be a promising range for the Indian software division. It is basic that India ought to concentrate on the ranges where programming skill matters more than the assembling foundation. Clearly, it will, in any case, require a huge change in infrastructure, more extensive law changes, and cautious appraisal of business sector requests.

The information presented in this study comes mostly from two sources: secondary sources, such as comparative analysis and case studies of Indian countries, and primary investigation of the Indian software sector. One hundred one-to-two-hour semi-structured interviews have been conducted in addition to observation and document analysis between the years 2020 and 2022. Interviews with managers of software companies, programmers, government officials, and industry experts were conducted.

Literature Review

Kishor Sharma (2000) investigated the factors of export success in India using yearly reports from 1978 in a simultaneous equation framework. However, these findings should be viewed with care. This implies that restrictive monetary and fiscal policies are critical during periods of high growth to keep domestic pricing and demand pressures under line.

Lages, Luis Filipe, and David B. Montgomery (2001) discussed a theoretical framework that makes it possible to observe simultaneously how export assistance, managing multinational experience or expertise, and industry or market competition affect the choice to adapt or standardize the domestic pricing strategy to the primary foreign market and, ultimately, how well a firm performs annually in exports. Surprisingly, the data indicates that there is no overall influence of export assistance on export presentation because exporters use the advice they receive to create inappropriate price plans.

Parthasarathi, A. (2002) said that even though it is mostly an export sector with the United States as the primary market, it reflects the phenomenal development of software and services in India's information and communication technology (ICT) business during the last five to seven years. Due to this, there has been a substantial "brain drain" of highly skilled ICT professionals, as well as a disrespect for the many ICT applications that are offered on the local market.

Sanjay K Singh (2003) analyzed how the development of India's economy may be influenced by

information technology. Standard policy actions, like enhancing the infrastructure, bolstering the education and training systems, and enacting flexible labor regulations that have an influence on every sector of the economy, including the IT industry, must be adopted in order to accomplish the same results. Additionally, the government must take concrete steps to encourage IT use and make it available to all facets of society.

Kundu, S. (2004) indicated the evolution of government policies and the relevance of the software export company development in Taiwan and India as precedents for other industries. The essay also examines the related export business of IT-enabled services. However, India dominates the software export market, outperforming China and Taiwan by a factor of six to fifteen.

Farok, J., Contractor, C.C., and Kundu, S. (2005) investigated the worldwide expansion and competitiveness of software businesses in India and Taiwan during the last decade. The theories are drawn from research in the fields of entrepreneurship, international business, and strategic management. Singh Sanjay (2006) examined the potential role of Indian growth in a global economy. It should be encouraged and exploited as an instrument for improving and enriching the lives of ordinary people. It has only recently begun to shift toward higher-value-added commodities and services. India will not get the full benefits of its achievements until its larger academy and explanation system gives opportunity for local people and villages to reap the rewards.

J. Bhatnagar (2007) emphasized the backdrop in which business process outsourcing (BPO) has quickly developed in India, as well as the crucial necessity to learn about human resource management (HRM) methods and systems in this industry. The findings focus on the structure, character, and organization of Indian BPOs, as well as the strategic significance of HRM in such firms. Furthermore, the findings highlight the implementation of certain HRM strategies such as recruiting, performance assessment, training and development, and compensations.

According to A. Illiyan (2008), the software business has emerged as a foreign exchange earner and a source of large-scale job prospects. Among the study's recommendations are that we need effective government policy, management attitudes, and cyber-savvy executives to support high-risk, long-term investment. There is also a need to attract significant amounts of foreign investment and technology to revitalize the Indian IT industry and make it more competitive globally.

Agarwal (2009) reported on the outcomes of a research of nine financial services industry knowledge process outsourcing (KPO) companies. Therefore, research on strategic renewal is likely to benefit from employing diverse perspectives and literatures. Furthermore, research on strategy renewal can influence a variety of literatures, including the study of young "entrepreneurial" enterprises and the study of industry population dynamics, potentially yielding new insights.

Arora and Bagde (2010) analyzed the impact of regional development in software exports during 1990 and 2003 on engineer supply, as measured by engineering baccalaureate capacity. We demonstrate that the ability to obtain an engineering baccalaureate has a significant impact on the growth of software exports, even after controlling for other significant determinants.

Moghaddam et al. (2011) said that an export marketing strategy may be categorized using a number of different approaches, including product strategy, promotion strategy, price strategy, and location strategy. Additionally, the experimental findings of earlier studies on various aspects of export marketing strategy are reviewed, as well as the connection between export marketing strategy and firm export performance. The results also highlight the necessity of matching a nation's economic objectives to its level of development.

Sahoo (2012) covered the two divisions of international commerce in commercial services in China and India. The second portion looks at the broader impacts of increased service trade, while the first half focuses more on the specifics of the two nations' service commerce. A deeper understanding of the circumstances in both nations will help ensure that the appropriate governmental policies are put into place because the future growth of both countries is highly dependent on services trade.

Priya (2013) studied the main effects of workplace stress, how it affects the psychological and physical well-being of female employees, and how it affects commitment among workers. According to the findings of the Friedman test and structural equation modelling, the two main factors affecting how stressed-out female employees are at work are the inability to fulfil deadlines and job insecurity.

According to Kathpalia et al. (2014), the company's focus on the North American and European markets is mostly to blame for the suffering. Future service offerings, local markets, and technical developments for the Indian IT and ITES sectors, these findings offer a succinct illustration of the relationship between microeconomic factors and changes in income.

Sahoo et al. (2015) covered a distributed lag auto-regressive approach used to study the contributing elements to Indian software exports. According to the findings, the government of India's legislative initiatives and openness, as indicated by higher education enrollment, have significantly contributed to the promotion of Indian software exports both in the short and long terms.

Aneesha Chitgupi (2019) estimated the drivers of software services exports (SSE) using a panel of 45 countries from 2000 to 2014. The dependent variable is software services exports (SSE) represented as a percentage of total world software services exports. The empirical findings imply that the exporting country's GDP, R&D expenditure, and decrease in trade barriers enhanced SSE; however, internet penetration may have resulted in the diversion of software services to the local market, lowering exports.

Manzoor Hassan Malik and Nirmala Velan (2020) examined how India exports software and IT services. To assess the relationship between the key variables' long-run equilibrium, co-integration tests were first used. Next, the error correction methods and long-run coefficients were computed. The analytical findings show that the presented variables have a trustworthy long-run equilibrium connection. It has been established that elements like external demand, currency rate, human capital, and openness index significantly affect the export of IT software and services over the long term. Furthermore, we discovered that the coefficient of error correction term is negative and significant at the 1% level of significance, demonstrating that adjustment will occur when there is a short-run divergence from the relationship's long-run equilibrium because of a shock.

Geethanjali Nataraj and Ashwani Bishnoi's (2022) talked about the development of the financial system, better prospects for growth because of higher levels of education, and management through empirical analysis; it is demonstrated that depreciation of the exchange rate and a change in the economic structure toward industrial activity both significantly increased India's exports of services. The study also evaluated the quantity of services exported by the key industries, identifying important challenges, and suggesting appropriate governmental measures.

Leena Ajit Kaushal (2022) wrote about how RTAs effect India's export efficiency as a whole variation of the gravity model. This illustrates the importance of first-rate institutions and increased regulatory quality in realizing potential export levels to partner countries. According to the report, the regulatory quality of importing countries considerably boosted India's export effectiveness.

Objectives of the Study

- To study the performance, growth, and factors affecting services exports of the software industry.
- To analyze the software export experiences of India and develop a "Software Export Model" based on the analysis.

Methodology

The research is descriptive in nature and is based on secondary information gathered from a variety of publications, journals, books, periodicals, and internet sources.

Software Exports from India

Simply said, India is the most successful export country since it has the most software exports among countries that first began exporting after the 2000s. However, there are certain other traits that distinguish India from other countries such as*: 1) Longevity:* In comparison to other countries, India was a pioneer, with visible software exports starting before the 2010s; 2) *Global significance:* Over 7% of the world's software production was exported from India in 2003 (domestic software production/sales excluded). The fact that each has consistently held a share of at least 0.5 percent of world output for more than seven years might be considered a distinguishing feature; and 3) *National importance:* At least 5% of all products and

service exports, as well as 1% of India's GDP in 2003, came from software exports. The former number exceeds that of the G7 countries, where the average GDP share of all software output (for both local and export markets) is less than 1.5 percent (Arora & Gambardella, 2004).

Table I
Software Exports from India

Year	India (US$)
2020	68000
2018	66000
2016	57000
2014	58000
2012	49000
2010	40000
2008	38000
2006	9100
2004	8600
2002	7550
2000	5300

Source: (timesofindia.indiatimes.com), 2021

Table II
India Software Exports as a Proportion of GDP and Exports

Software Exports	India
Exports of software as a % of GDP (2021)	20.78%
Software exports as a % of all exports of products and services (2021)	21.6%

Source: World Bank world development indicators; World Trade Organization

According to the Economic Survey report for 2021–2022, India has excelled in the international trade of services since COVID–19, propelled by the robust performance of the computer services sector. In the first half of fiscal year 2022, computer services made up 49 percent of all exports of services. The report attributes the strong rise to increased demand for cloud services, infrastructure modernization, and digital assistance "due to developing pandemic concerns."

According to the Survey, India's services exports rose by 18.4% percent to $177.7 billion in 2021–22 (April–December) over the previous year and by 11.0 percent over 2019–20 (April–December), surpassing pre–pandemic levels despite international restrictions and weak tourism revenues brought on by the Covid pandemic.

"This is mostly due to the top three services—computer, business, and transportation—which account for more than 80% of all service exports." Services exports held up well from Q2 onward and steadily climbed to reach $60 billion in Q3 of the fiscal 2022 period, it was reported. This followed a dip in Q1 of the fiscal year 2021.

With nearly 49% of all service exports in the first half of fiscal 2022, computer services remain the most exported service. Since the second quarter of fiscal year 2021, they have seen positive sequential growth because of rising demand for cloud services, digital support, and infrastructure modernization due to new pandemic challenges. The greatest FDI equity inflows of $7.1 billion were made in the industry of

computer software and hardware between April and September 2021, according to data on FDI inflows. In terms of FDI equity inflow, Singapore continues to be the leading investment nation, with the United States coming in second.

By 2025, the Indian software products market is anticipated to generate $100 billion in revenue. In order to enhance their worldwide delivery hubs and widen their global reach, Indian corporations are concentrating on making investments abroad.

A $250 million USD market for data annotation existed in India in FY20, with the US market making up 60% of that amount. By 2030, it is estimated that the business would generate US $7 billion due to a rise in local demand for AI.

In FY21, 149 billion US dollars' worth of goods were sold by the Indian IT sector. By making up more than 51% of all IT exports, the export of IT services has had the greatest impact (including hardware). Engineering and R&D (ER&D), software products, and BPM accounted for 20.78 percent of all IT exports in FY21. By 2022, it is anticipated that the ER&D market will reach $42 billion.

The largest recorded number of new hires in a single year came from the IT sector in FY22 (as of February), totaling 4.5 lakh. Among all new recruits, women made up 44% of the population.

Factors For Software Export

Why have Indian countries been successful in exporting software? We did a "template analysis" of qualitative data about India gathered from our respondents, as well as secondary sources, in an effort to try to address this question (King, 1998). In order to get started, we looked at the factors that were associated with the expansion of software exports in one or more Indian states. At least thirty distinct possible variables were identified; however, after further investigation, we discovered that they could be classified into five major categories:

- Demand: both global and local.
- The aim and measures to build software exports are outlined in the national vision and plan.
- International ties, including reputational consequences and trust.
- Size, competitiveness, clustering, and collaboration are all aspects of the software business.
- Human capital, technology, and money are examples of supply factors and infrastructure.

Categorization of success variables based on interview data and secondary sources. To provide a more thorough knowledge of the factors that have helped India's software exports expand and develop, we will build on this foundation in the next section and discuss each of the five categories in more detail.

Demand

The kind of demand has been essential in India. The success of an export has been heavily influenced by global demand. The global software and services market has expanded at a rate of approximately 20 percent annually since these countries started exporting, from roughly US $10 billion in 1983 to US $8800 billion in 2022 (Heeks, 1996). Early in the twenty-first century, there was a severe shortage of software workers as a result of this rapid expansion, with deficits for major economies (KPMG/NASSCOM, 2004) it is estimated to be in the hundreds of thousands. There has been a significant pull into the software export market as a result of the growth of IT outsourcing generally and global sourcing of goods and services. In the 1990s, when few of the nations that would follow were involved, it was also understanding of mistakes, delays, learning curves, and other things.

The importance of global demand was underlined from 2000 to 2003, a time when it is estimated that the global software market shrunk by up to 3% annually (Kodituwakku, 2003). Positively, India's exports in 2003 increased from those in 2000. Indian exports have shown to be the most robust. Even if annual growth rates have been reduced by half, they are still over 18 percent due to Western clients' preference for outsourcing services to low-cost nations throughout both expansionary and deflationary periods. However, interviewees said that when contracts were cancelled or delayed, programmers from the US and Europe were being sent back to India. According to several models, like Porter's (1990), long-term economic competitiveness is largely dependent on domestic demand. According to secondary statistics and

interviews, India's domestic demand has been crucial, but in connection to its weakness rather than its strength. The local market's modest size and low profitability, according to Indian software entrepreneurs, led them to turn their focus to exporting. Despite its vast population, India has domestic market limits due to low disposable incomes, subpar investments, and significant rates of piracy.

An analysis team predicted that in 2022, the amount spent by the government on information and technology will increase 12.1% to $9.5 billion. According to a Gartner analysis, the government IT (Information and Technology) spending is expected to expand by less than 15% in 2021 but more than the projected global growth rate of 5% in 2022. The company's principal analyst, Apeksha Kaushik, predicted that in contrast to global trends, all categories will grow in India in 2022. The firm predicts that in 2022, the IT services vertical will grow by 13.4 percent to $2.40 billion, while the software vertical will increase by 27.9 percent to $2.195 billion.

STPI estimates that linked IT firms' software exports totaled Rs. 1.20 lakh crore (US $16.29 billion) in the first quarter of FY22 (Indian Software Technology Park). In FY21, $150 billion is anticipated in export income for the IT industry. Second, IT spending in India is predicted by Gartner to rise to $98.5 billion in 2022 from $93 billion in 2021 (7.3 percent YoY growth). As of FY21, India's BPM industry employed more than 1.4 million individuals, compared to the over 4.5 million people employed in IT and BPM as a whole. Income from the platform Software-as-a-Service and -as-a-Service will increase from 37.1 percent in 2020 to 59 percent in 2025 throughout the whole software business. As a result, Table III demonstrates that the majority of India's software industry is focused on exports.

Table III

Balance of Export- and Domestic Oriented Revenue in India

India	In US$
Domestic Oriented Revenue (2022)	US$ 9.5 bn
Total Software Revenue (2022)	US$98.5bn
Export Proportion of Total Revenue	80%

(Source:economictimes.indiatimes.com), 2022

National Vision and Strategy

Thus, it is understood that a national software export plan is essential to the success of computer export (Balasubramanyam & Balasubramanyam, 1997; Watson & Myers, 2001). Actually, it goes further than that. The rise of software in each nation has been largely attributed to a small but tenacious group of businesspeople and government officials who have a vision for what the technology can accomplish for the country. Such goals first emerged in the 1970s, were maintained during the hard times of the 1980s, and were fully achieved in the 1990s.

The specific tactics for reaching each aim have surely been iterative. That is, it did not predetermine the specific concept of market categories. On the other hand, given a starting point, strategy has easily modified to what has worked (and what has not). For example, in our discussions with policymakers and business executives in India, the ability for such iterations and flexibility -- present in both the public and commercial sectors -- was recognized as an especially key factor in the expansion of software exports.

Of course, being the first with something new was their most crucial initial tactic. However, now that they are no longer alone, what successful method have they adopted to maintain market share? For all three, rising competition from other software adopters has been the basic challenge that has inspired effective strategy. However, each nation has chosen a somewhat different strategic path because of its own market niches and other characteristics.

Body shopping programming services began in India, and enterprises encountered issues, such as increased labor costs, brain drain of local workers, and competition from new competitors. Offshore

management has, therefore, been the major successful technique in the Indian software industry: gaining the project management knowledge required to do this and contracting out work to India rather than the customer's location. The Capability Maturity Model (CMM), a certification program with multiple levels that attests to the excellence of software programming process management, is used to demonstrate this numerically. In 2004, 60 of the 80 organizations with CMM level 5 accreditation—the highest level—were software companies (DoC, 2004). India also has 330 documented CMM evaluations, much higher than the United Kingdom or Germany and second only to the United States and the United States (SEI, 2004). You should proceed cautiously when considering the winning technique. During one-on-one contacts between clients and developers, when it occasionally combines with vertical market specialization, it has reportedly been most successful, according to interviews (i.e., a concentration on Western customers in a certain industry like financial services, banking, insurance, or telecommunications). However, the sector as a whole still does a sizable amount of onsite work (body shopping), and there appears to be a vacuum effect, as if five new small enterprises join the market utilizing the low barrier onsite model for every major organization that shifts from onsite to offshore operations.

Despite the economic and financial advantages, it appears that Indian businesses have not advanced to higher-value software work, such as that related to understanding client demands or creating program specifications (Arora & Gambardella, 2004). As a result, it is unclear what, if anything, defines India's "third wave" strategy after onsite and offshore.

International Linkages

Making and maintaining connections with markets, consumers (and suppliers) abroad is essential for export success. All three countries have been quite effective in this regard. A national exodus was the original and frequently continuous source of such ties. If you look further, each early export featured an Indian expat who was crucial in convincing the US-based (or, less frequently, European-based) company to work with an India supplier or establish a presence there (Arora et al., 2001a; Carmel, 2003b). The potential for new relationships and trade has expanded along with emigration.

These relationships have offered more than just business contacts; they have also brought money and market knowledge. One-quarter of Silicon Valley's population of Indian descent had invested in an Indian start-up, and half had economic links to India, according Saxenian's study (2002). The value of the diaspora has grown thanks to reverse migration, including its knowledge, skills, social capital, and financial capital (Kapur & McHale, 2002). In all three countries, returnees have made investments in software start-ups since the mid-1990s.

Even though there is a sizable diaspora, export trade has also been promoted through conventional marketing techniques. Governments have made a contribution through fostering the development of trade and industry groups like the International Chamber of Commerce, establishing high-level trade ties, disseminating market data, organizing and funding participation at international trade fairs and exhibits, and more.

NASSCOM in India. Indian companies have benefited by establishing subsidiaries in other markets, which allows them to be close to clients or business partners. For instance, the Irish government has allocated specific funding to encourage the international expansion of local software enterprises, leading to the establishment of 70 subsidiaries in the United States alone.

The process of building trust, which is at the core of all software transactions, also includes becoming close to the customer (Sahay et al., 2003). Risks to consumers exist with all imports, but they are heightened when services are outsourced to far-off places No deal will take place without some degree of confidence. According to the information from our interviews, strong marketing, and diasporan networks assist in overcoming the first trust barriers. It is still a challenge for Indian software companies to maintain customer confidence by producing enough high-quality software on time, on budget, and in accordance with specifications. The nation's reputation and track record make it appear less hazardous and more trustworthy (and that also raises barriers to entry of other follower nations).

The development of intimate, growing client-developer ties has promoted the development of trust (Heeks et al., 2001). The bulk, if not all, of the significant contributors to all 3I software exports have

collaborated with a single, sizable overseas client. These clients frequently made an investment in a regional joint venture or subsidiary. By internalizing the costs of market transactions, they were able to grow their export operations while saving money and gaining confidence.

Indian governments have promoted these ties by offering multinational software exporters tax advantages and other financial and non-financial benefits and by easing regulations for business operations. Because of this, India, for instance, is home to several huge international software companies and nearly all significant IT organizations.

Software Industry Characteristics

Depending on their diverse operations, the characteristics of the Indian software sector vary. With a few exceptions, though, four qualities stand out as being commonplace. The first is concentration, the existence of a small number of enterprises with sufficient strength to forge take advantage of whatever scale economies that software development may offer, to maintain solid reputations or even brands, and to withstand market instability. The top ten Indian companies account for 57% of software export revenue; sixteen of them are $1 billion exporters, while Tata Consultancy Services, the largest, sells more than $10 billion annually.

The second trait is firm competition. Privately owned enterprises dominate all three industries, and entrance and exit restrictions are quite low. Hundreds of medium sized (50-500 employees) enterprises compete freely with each other beneath the larger players. In principle, this should reduce expenses and boost innovation. According to de Fontenay and Carmel (2003), this effect may be shown in the production sector, such as in Israel, but it is harder to understand how rivalry affects the service industry. Due of the severe worldwide disparity between demand and availability for software labor and the comparatively weak inter-firm competitive forces, many Indian and Irish businesses that outsource feel like they are "pushing at an open door" (Krishna et al., 2000). As a result, rather than pursuing distinctive or innovative strategies, many firms opt for essentially imitative ones.

Third, there has been clustering. In India, the bulk of the software export businesses are centered in Bangalore, Mumbai, Chennai, Delhi, and Hyderabad. When a group of software businesses receives physical infrastructure and labor/capital supply inputs more efficiently than a similar number of dispersed businesses, this is an example of locational economies at action (de Fontenay & Carmel, 2003).

The supply of infrastructure to the clusters has been facilitated by the governments. Additionally, clusters were thought to speed up the flow of knowledge and skills, such as industry trends and best practices.

Outside of the labor exchange between corporations, no concrete proof of this has emerged, though. The fourth characteristic is software businesses' capacity to collaborate in mutually beneficial fields including market research, global marketing, advocacy for legislation, and the exchange of best practices. India and, to a lesser extent, Ireland, are two countries where there are particularly few local backward/supplier and forward/client ties. Inter-firm business cooperation is something that is far less common. This has historically been made feasible because to effective government agencies and organizations for the software industry that are present NASSCOM and the Indian Department of IT are present in all three nations. However, it seems that both formal inputs like technology, money, and informal inputs are accessible, like knowledge and experience; global linkages have always been considerably more important than local ones. We will now closely monitor these supply-side issues.

Supply Factors and Infrastructure

Multiple factors contribute to the domestic infrastructure's fragmentation, which encourages and supports software exports. India's success in exporting has been facilitated by its strengths in a number of these fields.

People

When analyzing the data, we find that all but one of the sources attribute a large portion of the Indian nations' success in software export to labor inputs. The size, skills, and expertise of the local labor force are

generally used to characterize this element, which is the most frequently mentioned single factor. There might be some existing elements in this. Since the 1950s, India has had strong institutions for science and technology (particularly those connected to defense). However, concerted government efforts to increase the IT skill base have contributed to the creation of labor, particularly at the tertiary level, where India has developed and is still growing superb technical education institutions. As a result, the United States has more than its neighboring nations; it has more scientists, engineers, and technicians per inhabitant (UNDP, 2013).

Labor demand has been strong in addition to the labor supply. India's software export industry has attracted talent due to the stability, fame, wealth, and other benefits that this segment provides, as opposed to the fewer or weaker rewards and possibilities that other sectors, particularly domestic oriented software development, provide.

Labor costs are cited as a major consideration for Western clients and investors when choosing to purchase software from Indian countries. Compared to, say, the United States, where average annual programming wages surpass $50,000, these nations have a definite advantage. (BLS, 2013).

Overall, however, it is important to keep the issue of labor expenses in perspective and place it alongside other issues, rather than placing it above them. India A relatively small portion of overall manufacturing costs are labor expenditures, regardless of the output — whether it be services or commodities produced on-site or offshore. Additionally, interviews and other data show that clients and investors place a higher value on labor skills and motivation than expenses, as well as the ability to close the labor demand-supply gap.

Additionally, there are two other factors that affect India's prosperity. English, the language of information technology and international trade, is widely used in business and, to a significant degree, higher education in India. Knowledge is the second element. Initially through the diaspora but later through exports and client interactions, employees of Indian software exporters have amassed a sizable knowledge base about foreign software markets, about international business norms and procedures, and about specific customer wants and values. Their software export firm now has a great chance to grow sustainably, whether through services or products.

Technology

Initially, India's local technology foundation was a significant weakness rather than a success element. As a result, some people rely on body shopping to compensate for this shortcoming. Since 1991, government expenditures in technical infrastructure have expanded, while liberalization has boosted the engagement of private capital and international investors. Import tariffs and other impediments to such investments have also been removed. Our field analysis led us to the conclusion that software cluster locations presently outperform numerous Western nations in terms of the penetration and current status of telecommunications infrastructure and computing hardware.

Finance

All three governments have taken steps to increase the amount of working and venture capital accessible to software businesses. To do this, all three have made use of a variety of tax benefits, marketing subsidies, grants, loans, law reforms, and administrative changes: a blend of liberalization (less regulation) and marketing involvement (more government).

Overseas aid has also aided Indian countries and has been channeled into infrastructure development. In India's case, this has come from the foreign donor community.

Research and Development (R&D)

The Indian government has previously offered direct financing and tax breaks for initiatives involving software-related R&D. This frequently has at least some indirect advantages for the social infrastructure, such as the growth of abilities and knowledge. There are many benefits to innovation. Government-funded multimedia projects have given rise to games, commercial uses, and home use. Military financing has enabled breakthroughs in signal processing and encryption that are currently used by a range of internet

communication and security packages. However, we found few success stories in India, a service-focused country, particularly when it came to the commercialization of government supported R&D.

Other

Indian governments have helped by providing or facilitating utilities, business housing, and transportation infrastructure (road and aircraft), particularly in regions with a concentration of software exporters. They have aided in the development of the idea and best practice information infrastructure by encouraging process/quality certification and software industry groupings. Additionally, they have given the legal "infrastructure" required for reliable contracting and product development.

Table IV summarizes the preceding analysis, outlining the components found as contributing to software exports in Indian nations.

Table IV

Factors

Factor	India
Demand	External demand is high, but internal demand is low.
National Vision and Strategy	The following vision and plan are presented: onsite software services, followed by offshore management; key institutions.
International Linkages	Diaspora and established relationships, particularly with MNCs; reputation and trust, gained in part through CMM/ISO and anti-piracy efforts.
Software Industry Characteristics	Some major corporations; some impacts of rivalry, clustering, and collaboration.
Supply Factors and Infrastructure	Human capital that is strong, low-cost, and English-speaking; catching up in telecoms; access to money; and appropriate other infrastructure.

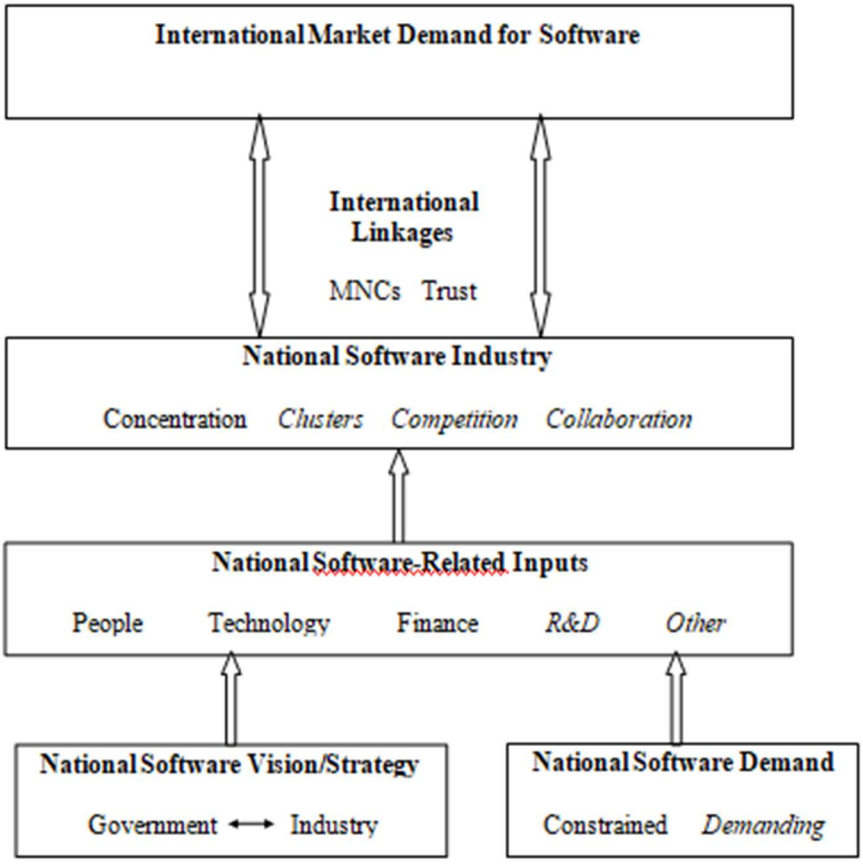
Source: Author's Compilation

Based on this study, the prior five-factor list may now be shown visually in greater depth. The "Software Export Model" is depicted in Figure 1. Enablers are shown in the middle between the top (demand/pull drivers) and bottom (supply/push drivers). The events with a qualifier are those that are in italics.

The Software Export Model

Figure 1

The Software Export Model



Source: Author's Compilation

The paradigm is founded on asserted and/or confirmed causal links found through qualitative research as opposed to quantitative research. As a result, it is impossible, for instance, to weigh various factors according to how much they contributed to India's good export performance. Additionally, this is not a controlled experiment in which one might examine the possibility of success in the absence of particular factors.

Conclusion

By examining the factors that lead to sectorial development in India's, we developed a new category model for the world's largest software export, the software export model in addition to assisting in the understanding of Indian countries' experiences. This study not only contributes to our understanding of the current success. However, it also sets the path for further evaluations of software trajectories and tactics in Indian nations. The institutional frameworks and practices that support strategic initiatives to enhance the efficiency of software exports will decide this. The concept's applicability may be readily extended beyond the five follower nations mentioned above, according to other studies using other permutations of the idea. The model may be used to improve national policymaking in addition to its conceptual significance in academic strategies for software export. Naturally, it must be noted that the model's careful evaluation of difficulties is only the preliminary step. Additionally, it must be possible to find appropriate solutions, put

those solutions into practice, and repeatedly recognize lessons from the cycle of analysis and action.

References

Sharma, K. (2000). *Export Growth in India: Has FDI played a role?* New Haven: Economic Growth Center, Yale University.

Lages, L. F., & Montgomery, D. B. (2001). *Export assistance, price adaptation to the foreign market, and annual export performance improvement: A structural model examination*. Graduate School of Business, Stanford University.

Parthasarathi, A. (2002). Tackling the brain drain from India's information and communication technology sector: The need for a new industrial, and science and technology strategy. *Science and Public Policy, 29*(2), 129-136.

Singh, K., & Sain, I. (2003). Prospects of agricultural exports of India: A composite index approach. *Prospects, 58*(4).

Kundu, S. (2004). The role of export-driven entrepreneurship in economic development: A comparison of software exports from India, China, and Taiwan. *Technological Forecasting and Social Change, 71*(8), 799-822.

Farok, J., Contractor, C.C., & Kundu, S. (2005). Explaining export performance: A comparative study of international new ventures in Indian and Taiwanese software industry. *Management International Review, 45*(3), 83-110.

Singh, S. K. (2006). Information technology in India: present status and prospects for economic development. *Directions: The Magazine of IIT Kanpur, 7*(4).

Bhatnagar, J. (2007). Talent management strategy of employee engagement in Indian ITES employees: key to retention. *Employee relations, 29*(6), 640-663.

Illiyan, A. (2008). Performance, challenges, and opportunities of Indian software export. *Journal of Theoretical and Applied Information Technology, 4(*11), 1088-1106.

Agarwal, (2009) Knowledge process outsourcing: India's emergence as a global leader. *Asian Social Science, 5*(1), 82.

Arora, A., & Bagde, S. K. (2010). Human capital and the Indian software industry (No. w16167). National Bureau of Economic Research.

Moghaddam et al. (2011). The influence of export marketing strategy determinants on firm export performance: a review of empirical literatures between 1993-2010. *International Journal of fundamental Psychology and social sciences, 1*(2), 26-34.

Soo, K. T. (2012). Services trade in China and India. *International Journal of China Studies, 3*(1), 25.

Priya, P. D. A. (2013). *A study on job stress of women employees in IT and ITes industries,* Tamilnadu.

Kathpalia, L. S., & Raman, R. (2014). The road ahead for the Indian IT and ITES: Industry considering its service offerings, domestic market and technology Trends. *Journal of Theoretical and Applied Information Technology, 60*(2).

Sahoo et al. (2015). Software exports from India: an econometric exploration. *Journal of Asia-Pacific Business, 16*(4), 274-301.

Aneesha Chitgupi. (2019). *Macroeconomic determinants of software services exports and impact on external stabilization for India: An empirical analysis.* Retrieved from https://ideas.repec.org/p/sch/wpaper/432.html

Manzoor Hassan Malik & Nirmala Velan. (2020). *An analysis of IT software and service exports from India*. International Trade, Politics and Development Emerald Publishing Limited, DOI:10.1108/ITPD-12-2019-0012

Geethanjali Nataraj, & Ashwani Bishnoi. (2022). India's service sector exports: Trends, challenges and policy road map. DOI:10.1007/978-981-16-7062-6_14, *International Economics and Finance*. (pp.253-282)

Leena Ajit Kaushal. (2022). Impact of regional trade agreements on export efficiency – A case study of India'. *Cogent Economics & Finance 10*(1), DOI:10.1080/23322039.2021.2008090

Arora, A., & Gambardella, A. (2004). The globalization of the software industry; perspectives and opportunities for developed and developing countries. http://www.nber.org/books/innovation5 https://timesofindia.indiatimes.com/business/india-business/in-charts-china-is-indias-third-largest-export-market/articleshow/91066772.cms

King, N. (1998). *Template analysis, in: qualitative methods and analysis in organizational research, G. Symon and C. Cassell* (eds). Sage Publications, London, 118-134.

Heeks, R.B. (1996). *India's software industry.* Sage Publications, New Delhi.

KPMG/NASSCOM. (2004) *Strengthening the human resource foundation of the Indian IT enabled services/IT industry,* New Delhi. http://www.nasscom.org

Kodituwakku, D. (2003). The software industry: Consolidation, focus and service. *Corporate Venturing Journal,* November, p.2.

Porter, M.E. (1990) *The competitive advantage of nations.* Macmillan Press, London https://economictimes.indiatimes.com/news/economy/finance/govts-it-spends-to-grow-12-pc-to-9-5-billion-in-2022-report/articleshow/92181694.cms https://www.varindia.com/news/indias-software-industry-to-touch-30-bn-revenue-by-2025-nasscom-

Balasubramanyam, V.N., & Balasubramanyam, A. (1997). International trade in services: The case of India's computer software. *World Economy, 20*(6), 829-843.

Watson, R., & Myers, M.D. (2001). IT industry success in small countries: The cases of Finland and New Zealand. *Journal of Global Information Management,* April-June, 4-14.

DoC. (2004). *Export IT report India.* Department of Commerce, Washington, DC. http://web.ita.doc.gov

SEI. (2004). *Process maturity profile, software engineering institute*. Carnegie Mellon University, Pittsburgh, PA.

Arora, A., & Gambardella, A. (2004)/ The globalization of the software industry; perspectives and opportunities for developed and developing countries, Innovation Policy and the Economy, **5**. http://www.nber.org/books/innovation5

Arora, A., Arunachalam, V.S., Asundi, J., & Fernandes, R. (2001a). *The Indian software services industry, Research Policy, 30,* 1267-1287.

Carmel, E. (2003b). The new software exporting nations: success factors. *Electronic Journal of Information Systems in Developing Countries, 13*(4), 1-12.

Saxenian, A. (2002). *Local and global networks of immigrant professionals in silicon Valley*. Public Policy Institute of California, San Francisco, CA.

Kapur, D., & McHale, J. (2002). *Sojourns and software: Internationally mobile human capital and high-tech industry development in India, Ireland, and Israel.* Draft Working Paper. http://www.people.fas.harvard.edu/~dkapur/images/dk_sojourns.pdf

Sahay, S., Nicholson, B., & Krishna, S. (2003). *Global IT outsourcing: Software development across borders.* Cambridge University Press, Cambridge, UK.

Heeks, R.B., Krishna, S., Nicholson, B., & Sahay, S. (2001). Synching or sinking: global software outsourcing relationships. *IEEE Software, March/April,* 54-61.

de Fontenay, C., & Carmel, E. (2003). *Israel's silicon wadi: The forces behind cluster formation', in building High-Tech clusters, T.* Bresnahan and A. Gambardella (eds). Cambridge University Press, Cambridge, UK, 40-77.

Krishna, S., Ojha, A.K., & Barrett, M. (2000), Competitive advantage in the software industry: an analysis of the Indian experience, in *Information Technology in Context,* C. Avgerou and G. Walsham (eds), Ashgate, Aldershot, UK, 182-197.

de Fontenay, C., & Carmel, E. (2003). *Israel's silicon wadi: The forces behind cluster formation', in: Building High-Tech Clusters, T. Bresnahan and A. Gambardella (eds).* Cambridge University Press, Cambridge, UK, 40-77.

UNDP. (2013). *Human development report.* UNDP, New York.

BLS. (2013). *U.S. Computer software industry.* Bureau of Labor Statistics, Washington, DC.