


The IT industry, employment and informality in India: Challenging the conventional narrative

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Tom Barnes

Australian Catholic University, Australia

Abstract

The IT industry has been portrayed as instrumental to India's transition to a high-growth economy. But critics argue that it has delivered few benefits to the wider population. In this context, industry advocates have drawn attention to the direct and indirect impact of IT on output and employment. This article critically explores these claims by locating them in the conventional (neoliberal) narrative of India's recent economic development. It finds that industry claims are exaggerated and that IT industry demand is often linked to the creation of employment in industries dominated by informal employment arrangements. The prevalence of informal employment highlights problems of low pay and poor or hazardous working conditions. The IT industry's rise to prominence has traversed a deeply ingrained process of labour market informalisation. In exaggerating the employment-generating capacity of the IT industry, its supporters have largely ignored problems relating to the quality of employment.

JEL codes: L86, O17, J82

Keywords

India, informal economy, input–output methodology, IT industry, neoliberalism

Introduction

This article critiques conventional or neoliberal accounts of the Information Technology (IT) industry's role in Indian economic development. The neoliberal approach, as described here, places primacy on growth as an indicator of economic development. In

Corresponding author:

Tom Barnes, Institute for Religion, Politics and Society, Australian Catholic University, Level 6, 215 Spring St, Melbourne, VIC 3000, Australia.

Email: tom.barnes@acu.edu.au

doing so, critical and contrary indicators of economic development are ignored or downplayed, leading to a distorted and misleading picture of the economic development process.

This picture often reflects, and effectively apologises for, the economic interests of actors in powerful public and private institutions. The case study looks at the impact of the IT industry in India on output, employment growth and labour standards. For some time, India's IT industry has been the topic of competing positions advanced by industry, governments and scholars. One of the key contentions is the impact of the industry on employment. In this article, industry claims about both direct and indirect employment effects are tested. Reflecting its critique of the conventional narrative that dominates in industry and government accounts, this article reframes the employment question to incorporate the quality, as well as the quantity, of jobs generated through IT industry demand. The article demonstrates that the employment effect of the IT industry has been modest and, more importantly, has often fashioned ties that bind the industry to both new and long-established networks of informal labour via backward and forward linkages. While the IT industry has positively impacted India's transition to a high-growth economy, its emergence has intersected with a deeply ingrained process of informalisation in labour markets. While many industry and government reports influenced by the neoliberal policymaking approach have celebrated the IT industry's broad-based impact on employment, they have tended to ignore the quality of employment generated through inter-industry linkages. Thus, the article sheds light upon the critical role of labour and labour standards in underpinning economic growth.

The next section of the article outlines the conceptual approach to informal labour and employment taken in the article. This is followed by a section which explores competing claims about the character of the IT industry and its role in India's economic development. This is followed by a third section in which attention is drawn to industry and government claims about the indirect impact of IT industry demand on employment. In this section, the industry's 'output multiplier' is critically examined by focusing upon the relationship between IT industry demand and its impact on the quality of employment. It is demonstrated that much of the employment indirectly generated through industry demand has emerged in the informal economy. The dominant role of informal employment in these sectors has important implications for the quality, as well as the quantity, of employment. This final section also explores why the quality of employment has tended to be ignored in neoliberal accounts of the IT industry's development.

Economic development and informal employment

The neoliberal approach has provided what Subramanian and Rodrik (2008) have called the 'conventional story' of India's transition to high economic growth:

The conventional story about India, which can be glimpsed in any number of policy-oriented papers and newspaper articles, goes like this. Until 1991, India's policy-makers followed misguided policies that closed the economy to international trade, erected inefficient industries under state guidance, riddled the private sector with extraordinarily cumbersome and detailed regulations, and suffocated private economic activity with controls and bureaucratic impediments. Then, in 1991, the big breakthrough happened. Spurred by a balance of payments

crisis, Indian policy-makers turned to technocrats such as [former Prime Minister] Manmohan Singh, who promptly began the process of liberalizing the economy. Trade barriers were slashed; foreign investment was welcomed; the license raj was dismantled; and privatization began. The economy started to boom, with software exports and call centres leading the way. (p. 4)

As these scholars suggest, 1991 was a turning point in India's economy history. Facing a currency default in June 1991, the government rushed out a new industrial policy in which it dismantled the last vestiges of import-substitution, removed restrictions on private investment and began to loosen restrictions on foreign investment (Pínglé, 1999: 26–27). The government also introduced a series of financial reforms, including permits for new private banks and lifting many restrictions on Non-Resident Indians (NRIs) buying company shares (McCartney, 2009: 188). The sweeping nature of India's trade and investment reforms reflected the new influence and credibility of neoliberal policymakers in the state. Following the successful intervention of these 'market radicals' in 1991, the idea of self-reliance as an economic goal was jettisoned in favour of a belief in the existence of a 'benign (liberal-capitalist) order' (Sengupta, 2008: 39). From this point onwards, planning would be intellectually conditioned by neoliberal ideology, including notions of International Monetary Fund (IMF)-style structural adjustment and the alleged superiority of private enterprise over public ownership (Karbra, 2009).

While providing a new conceptual framework for legitimising policy reforms, these changes however did not represent the withdrawal of the state from the regulation of private enterprise. Austerity measures designed to cut government debt were unevenly applied. While subsidies for fertilisers, fuel and food were cut, the government continued to implement tax breaks for investors, manufacturers and exporters (Upadhyay and Bose, 2009: 131–132). Fiscal restraint was justified as a form of 'anti-statism' even though support for powerful sections of industrial capital increased significantly (Byres, 1997). Public subsidies for the IT industry have been part of this process, including the subsidisation of software service exporters, tax breaks on capital imports used for exports and the attraction of global IT investment through changes to foreign ownership laws. Land acquisition has been very important for the development of export-oriented industry through the provision of cheap or free land and the establishment of 'Special Economic Zones' (SEZs) (Upadhyay and Vasavi, 2006). For example, the largest share of SEZs in Karnataka in southern India emerged with the specific aim of generating export income from the IT industry (Banerjee-Guha, 2008). The state's capital, Bangalore, has become a global hub for IT and IT-enabled services. Such SEZs have diverted substantial public resources in the form of land, electricity and water supply (Murayama and Yokota, 2009).

Supporters of neoliberalism point to India's gradual transition from a low-growth to a high-growth economy (Ahluwalia, 2002). Between 2000 and 2010, the yearly average for economic growth per capita was 6%, up from 3.7% in the 1990s and 3% in the 1980s. By comparison, average growth was 2% in the 1950s, 1.5% in the 1960s and 0.9% in the 1970s.¹ In the 4 years to 2007–2008, India was the second fastest growing major economy in the world. In more recent times, the Indian economy has experienced problems with rising inflation and, in mid-2013, serious balance-of-payments instability (Ghosh, 2013). Nevertheless, it is reasonable to say that rising growth has been influenced by the liberalisation of trade and investment since the 1980s, including the 1991 reforms. But one of

the key problems with this neoliberal narrative is that it ignores other crucial indicators of economic development. This article emphasises the role of labour standards and informal employment in this process. Most of the employment generated in India during this period has been informal in nature. Informal jobs exhibit most or all of the following features: low job security or lack of protection from arbitrary dismissal, irregular hours, low pay (often with no minimum wage safety-net), no or little social security (such as medical insurance or sick leave), no formal work contract, vulnerability to hazardous working conditions and a lack of collective bargaining rights and freedom of association (Ahn, 2007).

While most employment has been generated in informal enterprises – known in India as the ‘unorganised sector’, reflecting firms that employ fewer than 10 workers – some of it has also been created in medium- and large-scale firms such as factories and offices, incorporating a wide variety of work and employment types. There is no question that informal labour dominates employment in India. By the early 2010, about 84% of all non-agricultural employment and virtually all agricultural employment was informal in nature (International Labour Organization (ILO), 2013). In fact, informal labour plays a dominant role in labour markets across the Global South. In Indonesia, 73% of non-agricultural employment was informal; 78% in Pakistan; and, in Latin America, ranged from 40% in Uruguay to 75% in Bolivia. In China, 33% of all urban employment was informal in 2013 (ILO, 2013). Many more people have been forced into informal jobs as a consequence of the global financial crisis, and there is strong interest among labour economists in creating new policies and institutions to help workers who lack access to social security such as income protection due to irregular work, or pensions, health-care and medical insurance (ILO, 2014a, 2014b).

Thus, the conventional obsession with growth comes at the expense of some important indicators of economic development such as labour standards and other measures of employment quality. The IT industry, and its wider impact upon labour markets, provides an excellent case study for this analysis since, as Subramanian and Rodrik (2008) have suggested, it has been presented as part of the neoliberal ‘conventional story’ of India’s recent economic development.

The contested character of India’s IT industry

The rapid growth of the IT industry has been much celebrated as part of India’s neoliberal economic reforms. Specialisation in software service exports has been framed in terms of India’s comparative advantage in services provision and its skilled labour endowment (Weede, 2010), with the potential to radically transform Indian society as a whole (NASSCOM-McKinsey, 2005). Evidence to support the contribution of IT to India’s transition has been repeated in many industry and government reports. According to NASSCOM (The National Association of Software and Services Companies) (2014),² India’s peak IT industry body, total revenue for the industry in 2012–2013 was USD109 billion, of which 70% was exports, mostly in software services. NASSCOM claims that employment in the IT industry grew by eight times between 2000 and 2009, reaching about 2.2 million. It claims that the industry generated indirect employment for around 8 million people by 2010 (NASSCOM, 2010). The basis for these claims is

discussed below. Similar claims have been repeated by government bodies (Government of India, 2007a, 2010b).

In contrast, scholars from various disciplines within the social and economic sciences have portrayed the IT industry as an enclave that withholds benefits from the wider population. Some point to the comparatively weak state of hardware manufacturing within the industry or its dependence on 'low-end, entry-level work' (D'Costa, 2009: 92; Gregory et al., 2009: 133). The high growth of the sector epitomises 'uneven' development, leaving other sectors of economy with relatively inferior growth and human development indicators (D'Costa, 2003). In employment terms, critics have pointed to the fact that employment in the industry represents a small fraction of India's total labour force (Majumder, 2009; Upadhyya and Vasavi, 2006). Such accounts echo concerns in earlier works that depict the sector as reflecting 'urban dualism' (Upadhyya and Vasavi, 2006) or as an 'enclave' (Balasubramanyam and Balasubramanyam, 1997).

Despite these criticisms, it can be argued that the IT industry positively influenced India's transition to a high-growth economy during the 1990s and 2000s, primarily through the contribution of software service exports to India's external position. Alongside workers' remittances, receipts from software services have become the most important contributor to the stability of India's balance-of-payments position in the past two decades. Receipts from software services are the largest single contributor to earnings through 'trade in services' on India's current account. Since India's trade and investment liberalisation reforms in the early 1990s, these earnings have contributed to significant foreign exchange earnings. In 2009–2010, software service receipts made up 31% of all non-merchandise trade earnings on the current account (Reserve Bank of India (RBI), 2011).

Software service exports continued to grow, albeit at a slightly slower rate, even as economic crisis gripped North America and Europe post-2008 (Government of India, 2010: 14) and even as India experienced a new bout of balance-of-payments instability in mid-2013 (Barnes, 2013; Ghosh, 2013). The growth performance and employment contribution of the IT industry complements industry claims for state support, such as infrastructure provision, electricity or tax concessions. However, criticisms about the IT industry's contribution to employment stand upon firmer ground. Evidence about the social composition of the industry labour force suggests that it is a relatively homogeneous group and that, by and large, the industry has not employed people from poorer or disadvantaged groups. Workers employed across different sectors of the industry tend to be higher caste, fluent in English and brought up in urban-based households in which members have tertiary qualifications (Murphy, 2011; Upadhyya and Vasavi, 2006). In this context, NASSCOM has tried to promote the impact of IT industry growth on employment, income and livelihoods outside the industry. They have focused on the indirect impact of the IT industry on employment in both urban and rural areas. The following section critically assesses industry claims about direct and indirect employment effects.

Linkages to informal employment

The most recent study of output and employment linkages co-sponsored by NASSCOM claimed that every high-tech job translates into about four jobs outside the sector (Gokarn

Table 1. Comparing output multipliers for 'Computer and Related Activities' (CRA), 2003/2004–2007/2008 (n = 130).

Item/year	2003–2004	2007–2008
Output multiplier for CRA	1.52	2.61
Average output multiplier	2.09	3.19
Number of sectors > CRA	103	49

Source: Author's calculations from Government of India (2008b, 2012).

et al., 2007). This claim has been repeated, uncritically, in industry reports (NASSCOM-Deloitte, 2008), academic studies (Deokar, 2007; Kite, 2013; Maheshwari, 2006) and government documents (Government of India, 2007a, 2010b; Organisation for Economic Co-operation and Development (OECD), 2010). In theory, demand from output in one sector generates output in other sectors through backward and forward linkages. According to these studies, the IT industry generates employment in construction, transport, hospitality and retail consumer goods (Deokar, 2007; Gokarn et al., 2007).

Gokarn et al. (2007) argue that every rupee spent by the IT industry translates into total output of 2 rupees in the wider economy. However, the 'IT industry' was not measured as a separate category in the input–output data used in their calculations. As a solution, the authors had to simulate the industry by using survey data on the wage expenditure of IT workers (forward linkages), survey data on the non-wage operating expenses of IT firms and imputed data on the capital expenditure of IT firms (backward linkages). These data are used to approximate the 'final demand' of the IT industry in an Input–Output Transaction Table (IOTT) for 1998–1999, producing a total output multiplier.

Nevertheless, more up-to-date government data have become available since their study was undertaken. IOTTs provided in Government of India (2008b) use National Industry Classifications (Government of India, 2007a) in which the contribution of the IT industry has been included as 'Computer and Related Activities' (CRA).³ CRA data from the most recent IOTT calculations suggest that the estimates by Gokarn et al. appear to be inflated. Final demand and output multipliers have been calculated for industry sectors in IOTT 2003–2004 and IOTT 2007–2008 (Government of India, 2008b, 2012). As indicated in Table 1, each rupee of final demand for CRA required Rs 1.52 of direct and indirect inputs in IOTT 2003–2004.⁴ Thus, CRA's output multiplier was 1.52. For IOTT 2007–2008, CRA's output multiplier was 2.61. This indicates that CRA's impact upon output is positive and grew during the 2000s. In both cases, however, CRA's output multiplier is below average for the 130 industry divisions recorded in the IOTT.

Table 1 also shows that the mean output multiplier for all industries was 2.09 in 2003–2004 and 3.19 in 2007–08. Furthermore, 103 industries had a greater total output multiplier than CRA in 2003–2004 and 49 industries had a greater total output multiplier than CRA in 2007–2008. While these data indicate that CRA's impact upon output has become larger in relative as well as absolute terms, they again demonstrate that its output multiplier is below average. The data from both IOTTs clearly demonstrate that a wide variety of economic activities have a greater effect on output than each additional unit of CRA output. Table 2 lists the 10 largest output multipliers in IOTT 2003–2004. This includes

Table 2. Top 10 largest output multipliers in IOTT 2003–2004.

Rank	IOTT code	Activity	Output multiplier
1	92	Communication equipment	2.9353
2	94	Electronic equipment	2.9239
3	89	Electrical wires and cables	2.8105
4	90	Batteries	2.7750
5	22	Animal services (agricultural)	2.7398
6	88	Electrical industrial machinery	2.7322
7	50	Art silk, synthetic fibre textiles	2.7093
8	91	Electrical appliances	2.6685
9	62	Plastic products	2.6667
10	93	Other electrical machinery	2.6644
Average (n = 130)			2.0941

Source: Government of India (2008b).

IOTT: Input–Output Transaction Table.

key manufacturing activities such as electronic equipment, electrical machinery and components, plastic products, some textile production and some agricultural activities.

Table 3 lists the 10 largest output multipliers in IOTT 2007–2008. This shows that construction's impact on output was over 15 times larger than that of CRA. Several other industries, like metal manufacturing, petroleum products and land transport, each had an impact on output approximately five times larger than that of CRA. Trade and motor vehicle manufacturing each had an impact on output over three times larger than that of CRA. These data demonstrate the wide range of activities, especially in manufacturing, that have a significantly larger impact upon output than that of the IT industry. Put simply, the impact of the IT industry upon output, and probably also employment, has been enormously overstated by Gokarn et al. (2007) and in the government and industry reports that have uncritically cited their findings.

Crucially, Gokarn et al. (2007) over-estimated the *quantity* and ignored the *quality* of employment generated in this process, arguing that the employment linkages of the IT industry created jobs for people from an unskilled and less-educated background. They claimed that, in 2005–2006, the IT industry created employment for thousands of drivers, housekeeping and maintenance staff, catering staff and security personnel (Gokarn et al., 2007: 2–3). Table 4 shows the share in total employment in both urban and rural areas for each of these sectors: catering, land transport (which incorporates paid drivers), private security and domestic labour (which incorporates housekeeping and gardening). This is based upon National Sample Survey Office (NSSO) data which are collected frequently by the Government of India to record household employment, as well as unemployment and consumption. The time-periods chosen for Table 4 correspond to the most recent IOTTs. Thus, 2004 (NSSO 60th round) corresponds mostly closely with IOTT 2003–2004 and 2007–2008 (NSSO 64th round) corresponds with IOTT 2007–2008. In addition, 2011–2012 has been included in Table 4 to compare data from the most recent survey results available (NSSO 68th round).⁵

Table 3. Top 10 largest output multipliers in IOTT 2007–2008.

Rank	IOTT code	Activity	Output multiplier
1	106	Construction	39.3504
2	63	Petroleum products	14.0982
3	80	Non-ferrous basic metals	14.0438
4	76	Other non-metallic mineral products.	13.7582
5	110	Land transport	13.6440
6	77	Iron, steel and ferrous alloys	12.2929
7	82	Miscellaneous metal products	10.6711
8	87	Other non-electrical machinery	9.5630
9	116	Trade	8.2835
10	97	Motor vehicles	7.8927
Average (n = 130)			3.1875

Source: Government of India (2012).

IOTT: Input–Output Transaction Table.

These data suggest that the impact of these sectors on total employment is very modest and mainly concentrated in urban areas. Catering remained at just 0.8% of rural employment from 2004 until 2011–2012 and only grew from 3.2% to 3.3% of urban employment over this period. Private security made a negligible impact upon rural employment and fell from 2.1% to just 0.4% of urban employment from 2007–2008 to 2011–2012. Domestic labour fell from 0.5% to 0.3% of rural employment from 2004 to 2011–2012 and was just 2.3% of urban employment in 2011–2012. Land transport represented the largest contributor to employment among these categories. But even this sector contributed just 2.7% of total rural employment in 2011–2012, and its share of urban employment fell from 7.0% in 2004 to 6.5% in 2011–2012. Thus, once again, Gokarn et al. (2007) were exaggerating when they wrote about the impact of employment generation in these occupations.

Nor did Gokarn et al. (2007) appear to consider the income, working conditions or employment status of these workers. While job creation is emphasised (and over-stated), the quality of this employment is ignored. This is a recurring omission in industry reports and in the government reports that repeat their findings. This is problematic, not least because of the strong likelihood that most of this indirectly generated employment falls within the informal economy. As indicated earlier, the vast majority of jobs created in the Indian economy are informal in character.

It is likely that most of the employment created through IT industry demand exhibits many of these features. For instance, many ‘housekeeping and maintenance’ workers are part of a broader category of domestic workers. The number of domestic workers has exploded in the last decade alongside the growth in middle-income households. Notwithstanding the modest overall impact of domestic work on total employment (cf. Table 4), the proportion of domestic workers in total female service sector employment increased from 11.8% to 27.1% in the 5 years to 2004–2005 (Neetha, 2010). Most workers are women, which raises specific problems, such as low pay, long working hours, personal security and sexual harassment (Ghosh, 2014; Neetha, 2009; Sankaran et al.,

Table 4. Share in total employment of key sectors influenced by IT industry demand, 2004–2012.

NIC-1998 code	NIC-2008 code	Sector	Share, rural employment (% per 1000 workers)			Share, urban employment (% per 1000 workers)		
			2004	2007–2008	2011–2012	2004	2007–2008	2011–2012
55	56	Catering	0.8	0.8	0.8	3.2	3.3	3.3
60	49	Land transport	2.4	2.4	2.7	7.0	7.1	6.5
74	80	Private security	0.0	0.2	0.0	0.2	2.1	0.4
95	97	Domestic labour	0.5	0.3	0.3	2.8	2.0	2.3

Source: Author's calculations from Government of India (2005, 2010a, 2013).
IT: Information Technology; NIC: National Industrial Classification.

2008). Many workers are required to perform tasks during irregular hours, such as early morning or late at night. Indian governments have historically resisted implementing measures to curb the exploitation of domestic workers. For example, in most states, there is no set minimum wage (Neetha, 2010). Many workers hired as security guards or cooks are employed through labour hire firms or contractors. Research in the National Capital Region has uncovered evidence of hundreds of labour contractors supplying workers as security personnel for firms in shopping malls, white-collar offices and the automotive industry (Barnes et al., 2013). Labour contractors usually take a percentage of the workers' salary and can prevent workers from addressing concerns with their on-the-job employers.

This is not to say that all of the workers employed as a consequence of IT industry demand are 'informal workers', or that all informal workers should be regarded (or regard themselves) as poor or browbeaten by employers. For example, land transport includes a variety of different transport occupations. While some are counted as part of the organised sector, there are many occupations in which the majority of work is undertaken in an informal environment, for instance, bullock cart or rickshaw drivers (Ahn, 2007). Nevertheless, the massive expansion of informal employment raises concerns about pay, working conditions and rights which should not be ignored in studies of industrial development (National Commission for Enterprises in the Unorganised Sector (NCEUS), 2009).

Furthermore, there are several other categories of employment affected by IT industry demand which are completely dominated by informal employment. In Appendix 1, there are two tables that provide disaggregated data on the CRA output multiplier for both IOTT 2003–2004 and 2007–2008. These tables show the additional output generated *in each industry* for every additional unit of final demand. In other words, they show how much each industry contributes to each additional unit of output generated by CRA. For IOTT 2003–2004 (Table 5), we can see that numerous industries contribute indirectly to the CRA output multiplier. We would expect employment in several of these to be

concentrated in the organised sector, such as banking and business services. However, some of the industries in Table 6 are dominated by informal employment. Construction, which represented 2.03% of the CRA output multiplier in 2003–2004, is a prime example of this. It is dominated by informal workers employed on low wages, under precarious arrangements and often working in unsafe conditions (ILO, 2002: 34–35). It relies predominantly on workers hired on a seasonal basis by labour contractors or intermediaries. By 2008–2009, an estimated 10.7 million construction workers, or 83% of all workers in the construction industry, were employed through these contracting arrangements. Typically, these workers receive sub-minimum wages and do not receive employment benefits or social protection (NCEUS, 2009: 143). The exploitation of construction workers has been widely documented (Breman, 1994, 2004; Nandal, 2006).

Trade is another example, representing 1.41% of the CRA output multiplier. Trade is a composite of wholesale trade and retail trade. Retail trade is the larger employer of the two, capturing 90% of rural employment in trade and 84% of urban employment in trade in 2005 (Government of India, 2008b). A large proportion of employment in trade represents the distribution of agricultural and food products. Most of this takes place through informal enterprises run by ‘intermediate classes’ in market towns scattered across India (Harriss-White, 2003). If we look at Economic Census (EC) data,⁶ small retail trading establishments play a crucial role in the total share of employment in India and in employment growth since the 1990s. In terms of employment growth between the fourth and fifth ECs (1998–2005), retail trade was the largest contributor to growth in establishments hiring workers. This employment was overwhelmingly concentrated in the unorganised sector (Government of India, 2008a, 1998).

Similarly, data from IOTT 2007–2008 (Table 6) also show a wide range of industries comprising the CRA output multiplier. Construction and trade are not listed in Table 6 as they make a below-average contribution to the multiplier, ranking 55th and 72nd respectively. However, some mining activities appear in this table, including copper ore (5.15% of the multiplier, ranking second) and mica (3.51%, ranking fifth). Mining too is dominated by informal employment arrangements. According to one estimate, about 80,000 illegal mines operate across India in comparison to about 10,000 licences granted (Sreedhar, 2012). Most labour conducted in mines is informal in character and mine operators are often able to avoid legal obligations. Within organised sector mines, there are a large number of trade unions that represent workers, but unions have very little presence in the illegal or informal mines (Pratap, 2011).

This evidence suggests that much of the employment generated by additional output in the IT industry tends to occur in sectors dominated by informal labour. These jobs tend to be associated with low pay and poor working conditions, while workers have few rights in practice. This seems to be particularly true for sectors such as catering, transport, private security and domestic labour as well as construction, trade and even mining.

However, more research can be done to corroborate this claim. While this article discussed sectors ‘influenced’ by IT demand, future studies could calculate estimates for employment multipliers.⁷ A further challenge is to construct a comparative industry-to-industry analysis. Since most employment in India is informal, comparative analysis could be used to explore exactly why IT demand does not lead to the creation of more

formal sector jobs. One candidate for comparison could be manufacturing in electronics, electrical components and machinery. Compared to many other Asian economies, electronics production has been historically weak in India (D'Costa, 2009). However, as Tables 1 and 2 confirm, its output multiplier is significantly higher than CRA. Given the development path experienced in many East Asian economies, manufacturing may represent a path towards greater formal employment in industry. A comparative analysis of IT services and electronics manufacturing could shed light upon this question in the Indian context.

Nevertheless, a key point of this article has been to critique the *omission* of these critical questions in government and industry reports. This is not to say that the indirect employment effects of IT industry demand only led to the generation of poor quality employment. But there is sufficient evidence in critical studies of these sectors to suggest that the quality of employment, and its association with informal economic activity, is worthy of much greater attention. The critical question is: *why* are these concerns downplayed in the conventional narrative? Two broad reasons can be identified. The first is simply that this narrative is aligned with the dominant economic interests in the IT industry. These interests reflect the leading export-oriented firms in the IT industry which have crystallised into a powerful voice represented, principally, by NASSCOM. The narrative also reflects the synergies between these firms and state institutions, such as the Department of Electronics, that have played a key role in providing significant fiscal assistance to the industry. As mentioned earlier, the industry's rise has been underpinned by assistance from governments, including cheap land, power, technological infrastructure and low taxation for export-oriented firms and foreign investors concentrated in SEZs (Pingle, 1999; Upadhyaya and Vasavi, 2006). This helps to explain why NASSCOM-commissioned analyses that celebrate the output and employment linkages of the industry have been repeated, without scrutiny, in several government reports.

The second reason why concerns about the quality of employment have been downplayed is that these views within industry and government broadly reflect the 'conventional story' of India's economic transition. As explained earlier, this story is neoliberal in its orientation, explaining India's transition as a triumph of free market forces and celebrating, above all, output and employment growth as indicators of economic progress. This article has challenged this one-sided story, both by looking more carefully at industry and government claims about the output and employment generated through IT industry demand and by focusing on the quality of jobs generated, including labour standards and the informal character of employment.

Concluding remarks

This article has critically assessed industry and government claims about the direct and, in particular, the indirect impact of IT industry output on employment in India. While the industry had some impact upon India's transition to a high-growth economy, similarly positive claims about employment growth are highly questionable. The evidence for employment creation within the industry suggests that only a small stratum of well-educated, urban-settled and higher caste people have directly benefitted from the comparatively high-income occupations the industry offers. Perhaps in recognition of this,

industry and government reports have emphasised the indirect employment impact of the industry through backward and forward linkages.

Most claims about indirect employment effects seem to have relied upon the study by Gokarn et al. (2007). If we compare their findings with evidence from more up-to-date datasets, we find that these claims appear unduly optimistic. More recent evidence shows that the impact of IT industry demand on output in other sectors, while positive, is smaller than has been claimed. Significantly, these claims appear to have misrepresented the real impact of IT industry demand. The output multiplier of 'Computer and Related Activities' is below average when compared to the output of all sectors.

More importantly, the indirect output and employment impact of the IT industry appears to have intersected with labour markets characterised by informal employment arrangements. This is true for several major sectors in which IT industry demand has an impact: catering, transport, private security, domestic labour and others. In most instances, production in these sectors relies upon well-established forms of informal labour and, in several cases, continues to undergo a process of informalisation. Consequently, they should be subjected to the critical scrutiny that has been applied more generally to informal employment in India.

Alas, such scrutiny is absent from industry and government reports that celebrate the IT industry's indirect employment effects and, either explicitly or implicitly, support ongoing financial and political support for IT firms by government. The quality of employment, including the incomes, working conditions and rights of workers, is almost completely ignored in these reports. This is somewhat ironic, given the claim that workers outside the IT industry have benefitted from its success. In this government-business narrative, what appears to matter is the creation of (some) employment through the expansion of high-growth industry, rather than the creation of decent employment, higher wages, safer working conditions and improved rights. Yet, ongoing government subsidy of this expansion is much harder to justify if the quality of employment is ignored.

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Notes

1. Author's calculations based on data from RBI (2011).
2. The National Association of Software and Services Companies (NASSCOM) treats the industry as 'IT-BPM' (Business Process Management, formerly referred to as Business Process Outsourcing), which includes software services (export and domestic), software products, hardware production and ITES/BPM. ITES refers to back-office jobs such as accounting, book-keeping, auditing and other tasks that can easily be outsourced to help-desks or call centres. Of 'IT-BPM', software services exports constitute by far the largest and fastest growing section of the industry (NASSCOM, 2011).
3. This includes 'hardware consultancy, software consultancy and supply, data processing, database activities, maintenance and repair of office/accounting/computing machinery and other computer related activities' (Government of India, 2007b: 170).

4. The output multiplier is the Leontief Inverse for a 130×130 square matrix. To take the example of Input–Output Transaction Table (IOTT) 2003–2004, each Rupee of final demand for Computer and Related Activities (CRA) requires Rs 1.52 of direct and indirect inputs. Final demand ('total final use') for CRA is Rs 679 billion, or using the Indian decimal system, 6,787,878 lakhs. According to Government of India (2008b: 20), final demand is a composite of private final consumption expenditure, government final consumption expenditure, gross fixed capital formation, change in stocks and the trade balance (exports minus imports). Given the matrix equation

$$X = F \times (I - A)^{-1}$$

where X is the total output, F is the final demand and $(I - A)^{-1}$ is the Leontief Inverse for a 130×130 square matrix; we thus obtain

$$X = (6,787,878 \text{ lakhs}) \times 1.5212 = 10,325,720 \text{ lakhs}$$

Thus, the output multiplier for CRA in 2003–2004 generated Rs 10,325,720 lakhs (Rs 1.03 trillion) of output value at factor cost.

5. National Industrial Classification (NIC) codes used in National Sample Survey Office (NSSO) and other official data have changed over time, hence the use of NIC-1998 and NIC-2008 in this table. There are also different codes for NIC-2004 but, for the purposes of this study, they can be treated as the same as NIC-2008. These data are also based on the 'usual status (principal and subsidiary)' of workers which takes into account the economic activity in which a person spent a 'major' amount of time and the activity in which a person spent a 'relatively shorter time' in the year prior to the survey. This incorporates people working in more than one job and those moving between jobs (Government of India, 2013).
6. The Economic Census (held in 1977, 1980, 1990, 1998, 2005 and 2013) is a record of employment and economic activity (primarily non-agricultural) in the unorganised and organised sectors.
7. An obstacle to this is that Gokarn et al. (2007) do not clearly outline the data used to calculate their labour coefficients.

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Author biography

Tom Barnes is a postdoctoral research fellow at the Institute for Religion, Politics and Society, Australian Catholic University. He is currently researching labour movements and the global automotive industry in Australia, the United States, Indonesia, India and China. He blogs at <http://tombarnes.info/>.

Appendix I

Table 5. Activities with output multiplier > average for CRA ($\mu = 0.0117$), IOTT 2003/04, reverse order by size.

Rank	IOTT code (n = 130)	Activity	Multiplier (Leontief Inverse)	% total
1	124	Computer and related activities	1.0568	69.47
2	118	Banking	0.0600	3.94
3	123	Business services	0.0501	3.29
4	117	Hotels and restaurants	0.0323	2.12
5	106	Construction	0.0308	2.03
6	116	Trade	0.0214	1.41
7	94	Electronic equipment	0.0195	1.28
8	115	Communication	0.0176	1.16
9	110	Land transport	0.0161	1.06
10	107	Electricity	0.0150	1.00
11	122	Medical and health	0.0138	0.91
12	105	Miscellaneous manufacturing	0.0131	0.86
	Other ($< \mu$)		0.1747	11.48
	Total output multiplier		1.5212	100.00

Source: Government of India (2008b).

CRA: Computer and Related Activities; IOTT: Input–Output Transaction Table.

Table 6. Activities with output multiplier > average for CRA ($\mu = 0.0201$), IOTT 2007–2008, reverse order by size.

Rank	IOTT code (n = 130)	Activity	Multiplier (Leontief Inverse)	% total
1	124	CRA	1.0295	39.44
2	33	Copper ore	0.1345	5.15
3	100	Other transport equipment	0.1205	4.62
4	123	Business services	0.1010	3.87
5	36	Mica	0.0916	3.51
6	99	Bicycles, cycle-rickshaw	0.0915	3.50
7	94	Electronic equipment	0.0823	3.15
8	95	Ships and boats	0.0734	2.81
9	125	Legal services	0.0429	1.64
10	108	Water supply	0.0423	1.62
11	92	Communication equipment	0.0379	1.45
12	107	Electricity	0.0375	1.44
13	121	Education and research	0.0350	1.34

(Continued)

Table 6. (Continued)

Rank	IOTT code (n = 130)	Activity	Multiplier (Leontief Inverse)	% total
14	122	Medical and health	0.0319	1.22
15	29	Crude petroleum	0.0297	1.14
16	115	Communication	0.0245	0.94
17	104	Aircraft and spacecraft	0.0229	0.88
18	118	Banking	0.0228	0.87
	Other ($< \mu$)		0.5584	21.39
	Total output multiplier		2.6100	100.00

Source: Government of India (2012).

CRA: Computer and Related Activities; IOTT: Input–Output Transaction Table.