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Knowledge and Global Inequality: Monopoly, and Monopsony Capitalism

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Abstract

This paper seeks to explain the nature and basis of unequal development in the contemporary global capitalist economy. It characterizes the current structure of the world economy, as a combination of knowledge monopolies which also become monopsonies, largely located in the headquarter economies of the global North, with producer companies largely based on commoditized knowledge in the supplier economies of the global South. This division of the knowledge economy and related profits, affects accumulation and development in both parts of the global economy. Supplier economies can relatively easily acquire the commoditized knowledge of production, and, thus, advance to middle income status. The movement from middle to high-income status, however, requires the accomplishment of the much more difficult transformation of becoming a creator of knowledge that can be monopolized. Success in this transformation of the economy, however, also leads to struggles over geo-strategic reorganization of the world economy.

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CONTENTS

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Dev Nathan[1]

1. INTRODUCTION

Global inequality can be looked at in a number of ways. This paper looks at the difference in per capita GDP between countries as the measure of inequality. We try to explain this through the manner in which knowledge of production, or technological knowledge, has been created and used in the global capitalist world from about the 1970s till now, that is in the age of global value chains (GVCs).

The current structure of the world economy, a combination of knowledge monopolies, usually protected by intellectual property rights (IPRs), which also become monopsonies, headquartered largely in the global North (which we will also refer to as headquarter economies) and producer companies, using the commoditized knowledge of production, largely based in the global South (which we will also refer to as supplier or contract manufacturing economies), produces a hierarchy of profit rates. This hierarchy of profit rates, along with the distribution of knowledge between monopolized and commoditized production segments, both recreate the very unequal distribution of income from globalized production in global value chains (GVCs) and make it difficult for countries to overcome the existing distribution of labour within GVCs.

This results in the geographic difference between the knowledge-protected lead firms in headquarter economies and the firms with commoditized knowledge in supplier countries. The terms "headquarter" and "supplier" economies are from Baldwin (2016). They, however, resonate with the terms global North and global

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South and also bear a resemblance to the core and periphery terms of Wallerstein (1967) and Amin (1974). The important difference between our analysis and those of Wallerstein and Amin is that the latter see this division is a more-or-less permanent feature of world capitalism; while I see it as a structure through which economies can and have made breakthroughs.

To anticipate the argument of this paper, the creation of knowledge protected by intellectual property rights forms monopolies, and thus can create headquarter firms in what were earlier just supplier economies. It is through this process of creating monopolized knowledge and headquarter firms that economies from the global South can and have broken through into the ranks of the global North. This is a long process over decades during which these emerging economies are both headquarter and supplier economies. South Korea and Taiwan are the main examples of this transition, with China clearly engaged in this transition and even beginning to challenge US dominance in the creation of some areas of technology. Consequently, the headquarter-supplier divisions of labour and knowledge are global structures of production that, however, do not necessarily re-create themselves, but can be challenged and changed by deliberate policy measures in developing the knowledge economy. Development of the knowledge economy (Renn 2021) here involving the movement from utilizing to creating knowledge, becomes the critical factor in the movement from supplier to headquarter firms and economies.

The paper first outlines the broad dimensions of development in the contemporary global economy. After that it sets out the nature of the economy of monopoly-cum-monopsony relations in the global economy. It then outlines the role of the division between knowledge creation and knowledge utilization in the structure of the global economy. This leads to the hierarchy of profit rates between headquarter and supplier economies, which affects the process of accumulation of development in the two sets of countries.

Acquiring the knowledge of production, even advanced production, is more straight forward than the creation of new knowledge. Consequently, it is easier to make the transition from low-income to middle-income than to go beyond that to high-income status, leading to the middle-income trap. We relate this middle-income trap to the difficulty of developing the knowledge economy and the national innovation system to not just utilize but also create new knowledge and use that to establish lead or headquarter firms based on the monopolized knowledge. We then look at the impacts of such development on the labour force.

Few countries have successfully made the transition to a becoming an economy creating monopolized knowledge, lending credence to the notion of a middle-income trap. However, in overcoming this challenge in developing the knowledge economy, there is necessarily a strong element of techno-nationalism which, when successful, becomes a basis for expansionism. This leads to the struggle of the emerging economies to build their own markets and spheres of influence, manifest as part of the ongoing shift from a unipolar globalization to a multi-polar globalization and the accompanying geo-strategic conflicts.

LIMITED CONVERGENCE IN THE GLOBAL ECONOMY

Before proceeding to the explanation, it will be useful to first set out the main dimensions of both global divergence and convergence. The data are taken from Deepak Nayyar's very comprehensive analysis of Asian development (2019). The comparison is between "Western Europe and Western Offshoots" (which would include Canada, the USA, Australia and New Zealand) and Asia or other parts of the world. Our focus, however, is on the Western Europe (including offshoots) – Asia comparison. This paper does not deal with the Great Divergence, which is a much analyzed phenomenon (see Pomeranz 2000 and Parthasarathi 2011) and something I will take up in the future. But it is useful to set out the Great Divergence to note what has been accomplished in the relatively limited current convergence.

The Great Divergence is the fall of per capita income in China and India as a ratio of that in Western Europe and its offshoots from 50.2% and 44.6% respectively for China and India in 1820 to 7.1% and 9.8% for China and India in 1950, at the end of the colonial period.

Table 1
Divergence in GDP per capita between Western Europe–Western Offshoots and Asia: 1820–1962

GDP per capita ratios	*1820*	*1870*	*1900*	*1913*	*1940*	*1950*
Western Europe and Western Offshoots	100	100	100	100	100	100
Japan	56.0	36.1	37.0	34.8	53.9	30.5
Asia (of which)	48.3	26.6	19.1	16.5	14.4	10.1
China	50.2	25.9	17.1	13.8	10.5	7.1
India	44.6	26.1	18.8	16.9	12.9	9.8
Indonesia	51.2	28.3	22.1	21.9	21.8	12.8

Source: Adapted from Nayyar (2019)

The fall of per capita income in China and India relative to Western Europe was accompanied by a fall in the share of these countries in world manufacturing, which fell from 57.3% in 1750 to 28.3% in 1860 and 4% in 1952. Western Europe's share of world manufacture increased dramatically from 27% in 1750 to 93.5% in 1953 (Table 2). This decline of manufacturing in colonial Asia led to what has been called the Great Specialization (Findlay, 2019) – Europe and its offshoots specialized in manufacturing while the rest of the world, specialized in agriculture and the production of primary raw materials.

Table 2
Distribution of manufacturing production in the world economy: 1750–1963 (in percentages)

Year	*Europe, North America and Japan*	*China and India*	*World*
1750	27.0	57.3	100
1800	32.3	53.0	100
1830	39.5	47.4	100
1860	63.4	28.3	100
1900	89.0	7.9	100
1913	92.5	5.0	100
1953	93.5	4.0	100
1963	91.5	5.3	100

Source: Nayyar (2019)

Table 3
Asia disaggregated by sub-regions: GDP per capita in comparison with the world: 1970–2016

GDP per capita	*1970*	*1980*	*1990*	*2000*	*2010*	*2016*
as a percentage of GDP per capita in the industrialized world						
East Asia	4.3	4.2	3.7	6.2	13.1	21.1
Southeast Asia	4.5	5.8	4.2	4.5	8.1	9.4
South Asia	4.0	2.7	1.8	1.6	3.1	3.9
West Asia	18.4	36.3	15.2	13.8	23.2	21.9
Asia	5.0	5.7	3.9	4.7	9.1	12.3

Source: Nayyar (2019)

Post-1970 there is some convergence, though not quite a Great Convergence. East Asia, which includes China, South Korea and Japan, increased its per capita GDP in comparison with the industrialized world from 4.3% in 1970 to 21.1% in 2016. South Asia, on the other hand, virtually stagnated in its ratio to industrialized counties per capita GDP, being 4% in 1970 and 3.9% in 2016. Of course, per capita GDP did grow in South Asia in that period, but only at about the same rate as in the industrialized countries. East Asia did somewhat converge on the industrialized countries, which would mean that its per capita GDP grew faster than in the industrialized countries.

If in the Great Divergence the share of world manufacturing fell precipitously for Asia, in the current convergence East Asia's share of world manufactured exports grew from 13.5% in 1995 to 27.5% in 2016. Asia and developing countries as a whole too increased their shares of manufactured exports in this period.

Table 4
Manufactured exports in the world economy by country-groups compared with manufactured exports in Asia and its sub-regions: 1995–2016

	1995	*2000*	*2005*	*2010*	*2016*
(in US$ billion)					
World	3.7	4.7	7.4	10.0	11.3
Industrialized Countries	2.7	3.3	4.8	5.8	6.2
Developing Countries	0.9	1.4	2.5	4.0	5.0
Asia	0.8	1.1	2.1	3.5	4.4
(as a percentage of World)					
Industrialized Countries	73.8	69.7	65.6	58.5	54.9
Developing Countries	25.3	29.3	33.2	40.3	44.0
Asia	21.5	24.2	28.5	35.5	39.2
East Asia	13.5	15.2	19.1	25.0	27.5
Southeast Asia	6.1	7.0	6.4	6.7	7.2
South Asia	0.8	0.9	1.2	1.6	1.9
West Asia	1.0	1.1	1.9	2.3	2.5

Source: Nayyar (2019).

We now go on to an explanation of the limited convergence noting, in particular, its regional dimensions – somewhat more in East Asia and much less in South Asia. In a sense, this paper looks at an explanation of the diversity in Asian development noted in Nayyar (2019). We start with laying out the structure of global capitalism within which this development has taken place.

MONOPOLY-CUM-MONOPSONY CAPITALISM

That the structure of contemporary capitalism is one of monopoly has been argued not only by Hilferding (1910) and Lenin (1917) in the early 20th century, later elaborated by Baran and Sweezy (1966) and Foster (1986), but also restated in the context of lead firms or headquarter companies in contemporary global value chains (GVCs) by Durand and Milberg (2019) and Kaplinsky (2019). Pagano (2014) coined the term intellectual monopoly capitalism to designate the form of monopoly capitalism based on the monopolization of knowledge through IPR protection, which includes patent, copyright, trademark, and even old-fashioned secrecy, buttressed by non-disclosure and 'no compete' agreements. This analysis of intellectual monopoly capitalism as a new form of monopoly capitalism is further developed by Rikap (2021).

Intellectual property rights, in the form of patents, etc. are the enabling conditions for the creation of monopolies. The objective of such monopolies is to capture profits higher than those available in competitive conditions (Schumpeter 1944). For instance, James Watt's patent of the two-chamber steam engine allowed him to charge a price not just related to the cost production but also royalties equal to one-third of the fuel savings from the earlier Newcomen engine (Boldrin and Levine, 2008). Such monopoly profits increase inequality in the first or monopoly phase of an innovation, what Perez called the installation period of a new general purpose technology (Perez, 2002).

We do not repeat the data here, but just point out that knowledge monopolies, as in the so-called technology companies and healthcare, account for 8 of the world's 10 largest corporations by market capitalization (PWC, 2022). There is just one energy company, the Saudi Arabian Aramco, and one finance company, Berkshire Hathaway in the list of the top 10. The knowledge-intensive corporations with monopolized knowledge certainly dominate the world economy.

This intellectual monopoly capitalism also becomes monopsony capitalism in its interaction with suppliers largely from the global South (Kumar 2020, Nathan 2020, Nathan 2021, and Nathan et al 2022). Monopsony is the ability of firms to use power as buyers to reduce prices in the input markets; just as monopoly is the ability of firms to use power to increase prices in the output market. As pointed out by Robinson (1933) the first user of the term monopsony, a monopoly in the product market is necessarily a monopsony in the input market. Thus, what we have is a system of monopoly-cum-monopsony in the structure of the economy,

the global economy in this case. Further, as pointed out in Nathan (2021) there is a dual monopsony relationship in GVCs – first, is the monopsony of headquarter or lead firms as they deal with myriad suppliers, including capitalist firms and small producers, who compete among themselves; and second, is the monopsony relationship of these suppliers with their workforces.

Global value chains and the platform economy are both forms of monopoly-monopsony capitalism that dominate the structure of global economic relations, as seen in shares of international trade and market capitalization of corporations. GVCs now predominate as the channel through which the vast majority, more than 70%, of global trade is conducted (OECD 2020).Further, the new platform-based hyper enterprises, such as the American platforms (Amazon, Alphabet, Facebook), and the Chinese platforms (Alibaba, Tencent) account for 5 of the top 15 companies in market capitalization. Thus, it is the monopoly-monopsony structure that dominates much of international trade and global economic relations.

The monopolies we are dealing with here are created by the monopolization of knowledge, usually protected by intellectual property rights, which can include patents, copyrights, and trademarks. But along with the monopolized knowledge, there is the commoditized knowledge or knowledge in the commons of manufacturing or production more generally. This production knowledge is generally widespread or easily acquired through the world, often acquired through the purchase of machinery along with learning by doing (Arrow 1975). This distinction between monopolized knowledge and commoditized knowledge is reflected in the structure of globalized production in global value chains (GVCs). In GVCs there is a separation between conception and execution not at the intra-firm level, but at the inter-firm and even global level through out-sourcing as off-shoring.

This results in an asymmetric power relationship between the headquarter firms that specialize in the pre- and post-production tasks and the supplier firms that carry out the tasks of production. This relation between buyers and sellers in GVCs has been characterized as monopsony (Kumar 2020, Nathan 2020 and 2021, and Nathan et al 2022) The use of the term monopsony to characterize contracting relations between headquarter firms and their suppliers, should not be taken to imply that there is only level of monopsony power in these relations. As discussed in detail in Nathan (2021) there are different degrees of monopsony power in these relations. Broadly, suppliers with mainly commoditized knowledge, well distributed around the world, such as producers of garments or shoes, face a high level of monopsony

power; electronics suppliers face a medium level of monopsony power; and IT service suppliers face a low level of monopsony power.

The contemporary knowledge-based division of labour in global production gives us lead or headquarter firms with monopolized knowledge predominating in headquarter economies of the global North, while supplier firms with commoditized knowledge are the majority of firms in supplier economies of the global South. Given that workers involved in conception and product design would generally have higher educational qualifications than workers in production this difference in education would also show up in the relative skill levels of workers in firms in the same industry located in the global North and global South respectively.

This difference in skill or knowledge levels of workers is reflected in the distribution of revenue along the value chain. To use a well-known example, Apple received an astounding 58.5 percent of the price of an iPhone, while component suppliers received 14.3 percent and the Chinese firm assembling the iPhone received only 1.8 percent (Chang, Pun, and Selden 2016).

DISTRIBUTION OF PROFITS BETWEEN HEADQUARTER AND SUPPLIER FIRMS

Thus, the above structure of world trade and the global economy has its consequences for the distribution of profits between the pre- and post-production (design, brand, market) headquarter firms and the production or supplier firms. There is a high profit earned by headquarter firms with monopolized knowledge, while suppliers with commoditized knowledge secure just about competitive profits. This division of profits between headquarter and supplier firms in GVCs is illustrated below (Table 5) with a few examples, supported by an analysis of a large data base of 60,000 firms across the world (De Loecker and Eeckhout 2018).

The garment brands (Ralph Lauren and Levi Strauss), electronics enterprises (Apple, Cisco, and Intel) and the consultancy leaders (IBM and Accenture) had gross profit margins ranging from 40% to 60%, with the exception of Accenture, which had a margin of 30%.The two personal computer equipment suppliers, Dell and HP, both operate in the commoditized personal IT equipment market, and have lower margins in the low 20 per cents.

Looking at the other end of the GVC, manufacturers or suppliers working in competitive markets with easy to acquire, commoditized knowledge and subject to the high monopsony power of headquarter firms, secured much lower levels of

profits. In garments in India supplier margins remained in the range of 10 to 12 per cent (Nathan et al 2022). In electronics manufacture the knowledge level required of the supplier is of a medium level, higher than in garment or shoe manufacture. But much of the knowledge in electronics assembly is codified and thus easy to acquire. Simultaneously, there is a high economy of scale in electronics manufacture, providing the large units, such as those of Hon Hai, Flex and Jabil Circuit with some bargaining power vis-à-vis the buyers or lead firms (Raj-Reichert, 2018). Along with this, electronics suppliers are also able to diversify into other electronics value chains, such as those of aerospace. Thus, their supply curves are not as inelastic as those of garment manufacturers. Contract electronics manufacturers have low margins, at or below 5 per cent (Raj-Reichert 2018). But their large scales of production provide a high volume of profit, something that is important for accumulation and investment in knowledge production.

Table 5
Gross Profit Margins – Headquarter (USA) and Supplier (India) Firms

Name of Corporation		*Gross Profit Margin (%)*
USA	*2009*	*2021*
Ralph Lauren	58.2	66.7
Levi Strauss	48.0	58.3
Nike	44.4	46.2
Apple	41.3	43.3
Dell	17.2 (2016)	21.4
HP	23.6	20.7
Intel	55.6	54.3
Cisco	64.4	63.1
IBM	45.7	54.4
Accenture	30.4	32.3
India		
Infosys	43.1	32.8
TCS	27 (2013)	25.9
Garment Manufacture		6 (2016-17)
Leather		6.7 (2016-17)
Auto-components		9.7 (2016-17)
Pharmaceuticals		12.2 (2016-17)
IT Services		14 (2016-17)

Source: US data from https://www.macrotrends.net/stocks/charts/LEVI/levi-strauss/gross-margin (and for each other company in the table)

India data: Sector data from Annual Survey of Industries (ASI), 2016-17; Infosys and TCS from: statista.com

In IT services production, the knowledge requirements are more complex than both of the above types. Further, IT services are required in all types of economic, and social activities; meaning that the supply curves of suppliers can be quite elastic. Those in IT services supply with records of delivering and supporting complex IT services, have developed reputational assets that would increase their bargaining power. As a result, we find that the Indian IT majors, such as TCS and Infosys with their knowledge-capability-based reputational assets, insist on and get margins of around 23-25 per cent. The 30 percent gross profit margins of Infosys and TCS (Table 2) are at least somewhat comparable with those in the north. But overall, based on the Annual Survey of Industries (ASI) in the Indian supplier firms (garments, leather, auto-components, pharmaceuticals, and IT services) the gross profit margins range from a low of 6 per cent in garments to 14 per cent in IT services.

The abovementioned evidence about the asymmetric distribution of profit margins between headquarter and supplier firms, is supported by the analysis of 60,000 firms across the globe which shows that between 1980 and 2016, "the more developed economies tend to have bigger increases in markups [over cost], whereas some of the emerging economies see a decline" (De Loecker and Eeckhout 2018: 8). While Asia, home to many supplier firms, experiences a more modest increase than the global average, the region is diverse, with South Korea experiencing the biggest increase. Both Europe and North American had 2016 markups that were higher than the global average and also increases in markups between 1980 and 2016 that were higher than the global average.

These results would be broadly in line with our picture of headquarter firms securing higher profits than supplier firms; and high-income or developed economies with more headquarter firms securing higher profits than middle-income or low-income or developing economies with more supplier firms that secure lower profits. Further, the rise of South Korea from supplier to headquarter status is seen in its increase in markups between 1980 and 2016 which at 0.72 was about the highest in the world (De Loecker and Eeckhout 2018: 7).

MONOPOLY PROFITS OF HEADQUARTER FIRMS INCLUDE MONOPSONY EXTRACTION OF REVERSE SUBSIDIES

Above, we have referred to monopoly rents or excess profits. The realized gross profit margin of lead firms, however, is the result of both their monopoly and monopsony positions. Monopoly power in the product market allows them to mark-

up product prices; while monopsony power allows them to mark-down input prices, or prices of products produced by contract manufacturers in supplier countries. The concept of monopsony power in global production was introduced by Ashok Kumar (2020) and Dev Nathan (2020) and then elaborated in Nathan (2021) and Nathan et al (2022). However, the idea of unequal power relations between lead firms and suppliers is quite pervasive in the GVC literature, going back to Gereffi's buyer driven GVCs (1994/2018) and Kaplinsky's analysis of inequality and poverty in global production (1995). What monopsony power adds to the analysis is the idea that the power of lead firms in the input market allows them to secure inputs at lower prices. Prices are lower than what? We need a clear notion of what the benchmark is below which input prices are being pushed down.

Monopoly power is understood to be the power of the monopoly to increase product prices above the cost of production, including in the costs of production, the usual competitive profit necessary to stay in business. In the case of monopsony, we refer to the power of the monopsonist to push input prices below the costs of production in supplier countries. In an unequal world, the cost of production is different across the world. In the GVC model that we are using, the difference in costs is between production costs in the economies of headquarter companies, as compared to costs of production in the economies of supplier countries. That there is such a difference in costs is, of course, the reason for off-shoring in GVCs and has been identified in some analyses as imperialism (Smith, 2016; Nathan, 2018; and Suwandi, 2021).

Since, however, we are dealing with the impact of monopsony GVCs on accumulation in supplier economies, the benchmark for the comparison would be the costs of production in the supplier countries. But in costs of production we do not use just the existing monetary costs. These monetary costs exclude a number of real costs that are generally covered under the rubric of externalities. Taking just two important inputs from supplier economies into manufacturing, we include the externalized costs of labour and of environmental services in determining the costs of production.

For a firm, the costs of employing labour are the monetary costs that they incur in employing labour, i.e. wages and related social security benefits, summarized as the wage costs. Similarly, the costs of environmental services, such as fresh water, are the monetary costs of acquiring these environmental services. However, the actual costs of both labour power and environmental services may be above

these financial costs. Using the Marxist-Keynesian notion of costs of production, the cost of producing labour power is what is known as the living wage, varying between economies at different levels of per capita income, such as the high-income headquarter economies and the low- to middle-income supplier economies. When the actual wages paid in global production are lower than the living wage in a supplier country, the wage difference does not disappear in a real sense but is extracted from various parts of the supplier economy.

As argued in detail in the book *Reverse Subsidies in Global Monopsony Capitalism* (Nathan et al, 2022), the difference between living and actual wages is extracted as a forced subsidy from the bodies of the over-exploited women and men workers, from the use of women's unpaid labour in reproduction and care work, and from the rural economy, from which these circular migrant workers both come periodically and then return in sickness and lay-offs (as most dramatically seen by the reverse migrations in the Covid-induced recessions) and go back to on retirement. With women and other social groups, such as the former untouchables or Dalits of India, being more vulnerable, a higher reverse subsidy is extracted from them. Monopsony power is reflected in the use of the vulnerabilities of women and the intersection with other vulnerable categories, such as Dalits and minorities, to reduce wages.

With regard to environmental services, prices for fresh water do not cover their cost of reproduction. Effluent is mainly untreated, leading to the destruction of rivers, such as the Nooyal in Tiruppur and the Buriganga in Dhaka. Farmers in areas around the garment producing areas suffer economic losses from the reduction and pollution of ground water. Lands producing raw cotton accumulate inorganic chemicals, and the cotton producing belt of Punjab is known as the cancer belt of the state.

All of the above are real costs involved in garment production in GVCs, costs that are not covered in the monetary costs taken into account in estimating the cost of garments. Given the monopsony character of these GVCs, the reduction of monetary price is captured as profits secured by the garment brands and retailers. The result is the low price of the produced garment.

In Nathan et al. (2022), these unmet costs are termed reverse subsidies. They are reverse subsidies in the double sense that, firstly, they are extracted from the poorest players in and around the value chains, the workers who do not get a living wage, and the environment and those who use it, where the quality of the environmental resource is degraded and polluted; secondly, through the mechanism of global

monopsony, these subsidies are transferred from the point of extraction in the supplier segments of the GVCs to the brand and retailer segments of the GVCs.

These reverse subsidies are not trivial, something we need not bother about. Various calculations show that eliminating the wage subsidy by paying workers living wages would increase retail prices by not very much, e.g. just 6.8 per cent for Bangladesh (Miller and Williams, 2009). If we take a rough figure of another equal increase in retail prices necessary to cover the repair of environmental damage, that would mean a total of an additional cost of about 15 per cent of retail prices would be needed to cover the costs of production of labour and environmental services. If we take brand profits at 50 percent of retail prices, then, in a rough way, we could say that about 30 per cent of profits of headquarter firms' in GVCs are due to the reverse subsidies extracted from labour and the environment in the supplier economies of the global South; while the other 70 percent of the profits of headquarter firms are due to their monopoly positions in product markets of the global North.

The above analysis does not hold equally for all GVCs. The calculation of unmet environmental costs could hold. But the extent would depend on the resource-intensity of the product. It would be higher in the case of garments and leather products; somewhat less in the case of electronic products and the automotive sector; and much less for IT services. In the case of wages too an analysis of India shows that the living wage deficit is highest in the case of garments and shoes, lower in automotive products and not at all in the case of IT services; even when allowance is made for the different skill or capability levels embodied in workers (Nathan et al 2022).

Further, it should be noted that the use of monopsony power is a policy chosen by firms. It is not a given. For instance, the Toyota system of just-in-time production usually requires a close connection between input suppliers and the monopolist assemblers. For some critical inputs in the Toyota there might be a co-development of the input supplier and the lead firm, just as it might also be so in the case of knowledge-intensive products like IT services. The use of buyer power is not a given, it can even be counterbalanced by seller power. But in the system of global production divided between headquarter firms with monopolized knowledge and suppliers with commoditized knowledge there is a strong tendency for monopsony power to be deployed to increase profits by reducing input prices.

ACCUMULATION AND DEVELOPMENT

In terms of the distinction used above, an economy can be seen as the combination of these two types of firms, between supplier and headquarter firms. An economy that in its international relations is composed of supplier firms would be an economy with a low rate of profit and the employment of mainly low-skilled and medium-skilled workers. An economy that in its international relations is composed of headquarter firms would be an economy with a high rate of profit and the employment of mainly medium-skilled to high-skilled workers. The skill distribution of workers in the US and China, shown in Table 7, would be typical of the two types of economies. The structure of supplier economies, however, would also differ with respect to the GVCs of which they are part, whether of low-knowledge garments and shoes, medium-knowledge consumer electronics, or high-knowledge IT services.

If we put alongside the above the differences in the ownership of monopolized knowledge, the resulting differential distribution of profits between headquarter and supplier firms, and the point that these global production relations developed between economies that were already, through the colonial period and up to the 1970s, divided into high-income and low-income countries, and countries based on monopolized or commoditized knowledge, then we complete the picture of the global economic structure. What we now need to look at is how this global structure, based on the division of labour, knowledge, and profits in the global production system, would develop or evolve. We look at the impact of this unequal distribution of profits within GVCs on accumulation in both high-income headquarter economies (the global North) and low- to middle-income supplier economies (the global South).

IMPACT ON HEADQUARTER ECONOMIES

In the headquarter economies there is a fall in demand for low-skill labour, since manufacturing factories have, by and large, shifted to low- and middle-income countries. Unlike previous multi-national corporations' (MNCs) investments in manufacturing branches, headquarter firms in the GVC model do not need to invest in their own manufacturing facilities; they only need to invest in their own R&D, design, brand, and marketing activities. All these are largely investments in the intangible assets that form a large proportion of the assets of these lead firms protected by intellectual property rights'.

Since investment in manufacturing is carried out by contract manufacturers who are, in a sense, the outsourced production divisions of the lead firms (Rikap 2021), lead firms can use their massive profits to focus on increasing shareholder value, often carried out through share buybacks. As Milberg and Winkler (2010) point out, there is both a profit glut, created by GVC outsourcing, and the use of this profit to increase shareholder value, through share buybacks. The outsourcing of responsibility for investment in manufacturing facilities allows this use of profit to increase shareholder value. Along with this, the upward shift in profit rates and market concentration in the high-income countries have been found to be accompanied by drops in the rates of investment, firm entry rates, and labour's share of income (Syverson, 2019). At a political level this is likely to result in Trump and Brexit, as the headquarter economies substantially reduce the need for much of the low-skill employment in manufacturing.

IMPACT ON SUPPLIER ECONOMIES

In the supplier economies, rates of profit would be low, around 10 per cent, for garment and shoe manufacture, with wages below the cost of production or the living wage. It could be even lower in the case of agricultural products, where prices may not cover normal costs of production, including providing a living income for family labour. In electronics, we saw that profit rates could be lower, even as low as 5% or less, but with higher production volumes, resulting in a larger surplus for reinvestment.In the case of high value services, profit rates would be somewhat higher.

Profit from enterprises can be supplemented by household savings, besides government budget deficits and remittances from international migrants, to increase the overall rate of investment. In both China and India, high rates of household savings have fueled higher rates of growth. This reduces the effect of low profit on accumulation.

What, however, are the possibilities for growth and development within the GVC structure of the division of labour and knowledge? Many suppliers have grown by taking on more functions. In the garment industry, it is quite common for supplies to take on more function beyond the cut-make-trim of garment assembly. They take on sourcing and advance into what is known as "full package supply," where designs provided by buyers are turned into garments ready for the retail floor. Even though the margins may not increase, the increase in the overall volume of work performed leads to an increase in the amount, if not the rate, of profit.

This movement up the GVC has been called vertically- specialized industrialization (Milberg and Winkler 2013). It is vertically specialized in that it targets segments of production of a product. On the other hand, in the pre-1970s, horizontally specialized industrialization used to target all segments in the making of a product, such as consumer goods, e.g. garments, rather than investment goods, e.g. machinery production. The question about vertically-specialized industrialization is whether there is a liner progression from one segment to another, or whether there are discontinuities in the process in the movement across segments? This paper argues that there is a critical discontinuity in the progress from using knowledge within catch-up industrialization to creating knowledge and related technology. We first explore what can be done by relatively linear progression involving both learning by doing and reverse engineeting.

Will an increase in the size of suppliers suffice to create an oligopoly that could counter the monopsonist or oligopsonist power of buyers? It would do so, at least to some extent. Large suppliers would tend to have more stable order books and thus able to better plan both their own expansion and even their workforces, keeping more permanent workers on their rolls (Kumar 2020). Being better suppliers, with more on-time and quality production, they could also increase their bargaining power with lead firms.

Small producers have also combined in order to increase their bargaining power with monopsonist buyers. This associational power could increase supply market outcomes, as was reported in the case of coffee before Washington Consensus liberalization (Grabs and Ponte, 2019) . More recently, Ethiopian coffee has successfully registered trademarks for its popular local varieties of Arabica coffee. And, after much international campaigning, Starbucks agreed to pay a higher price for the trademarked coffees (Vaidhyanathan 2017: 5). But this would be limited by the ease of entry into production of coffee beans.

The one successful case of a monopsony being challenged by the sellers is that of petroleum through OPEC. The formation of this cartel of suppliers has enabled West Asia to reach up to around 20 per cent of per capita GDP of the industrialized world (see Table 3). The OPEC cartel of sellers was able to successfully confront the buyers' monopsony of the Euro-American oil majors.

What both the coffee and OPEC examples show is that the states of the suppliers play an important role in countering the power of monopsonist buyers. This remains important even in manufacturing value chains, such as in garments

and shoes. In China the central provincial government have brought together suppliers and secured some improvement, such as secure and increased orders and also promoted re-splintering and relocation of units (Mei and Wang 2016).

Volume would compensate for a stable margin, but an increase in the margin is likely to occur only in the case of suppliers that have the advantage of producing complex inputs and what are called chokepoint technologies. Some Japanese input producers, such as the producer of small motors used in automobile windows, have a virtual monopoly, protected by intellectual property rights (OECD 2013, 220). Such monopolist suppliers would clearly have stronger positions in bargaining with buyers. Even without an outright patent-protected monopoly a complex product, such as denim in comparison to regular cotton fabric, can enable a supplier to build both volume and a reputational advantage, as is the case with the Indian company Arvind, which produces 40 per cent of the world's denim.

All of these advances by suppliers, whether in producing full package supply or developing reputational assets in the case of IT services, require investment both within the firm and by publicly-funded institutes, such as India's National Institutes of Fashion Technology (NIFT) with branches in many states. Buyers or brands do, to an extent, help in supporting the development of technical capabilities that reduce costs, since cost reductions can be captured as lower prices of the outputs they contract. But in their interaction with suppliers, buyers try to keep suppliers out of the key capabilities of design and branding (De Marchi, Di Maria and Gereffi, 2018), though, as Kaplinksy (2019) points out, often unsuccessfully.

The movement from simple assembly to full package supply requires an investment in building firm-level capabilities. These capabilities are not just of management but also of workers. As Marion Werner points out about garment manufacturing in Mexico, it involved workers who were uni-skilled becoming multi-skilled, with the ability to move between tasks (Werner 2012). The step-up to full package supply also required detailed industrial engineering. In the automotive industry, moving beyond simple assembly requires reverse engineering supported by firm-level R&D (Tyabji 2018).

Many of these capabilities are developed through firm-level actions, but many also require assistance from training institutes, industrial engineering centers, and state intervention to overcome coordination failures and build capabilities. Overall, the supplier firms interact with public sector R&D units, as was the case with

leather units in Tamil Nadu, India with the Central Leather Research Institute (Tewari and Pillai, 2005). There needs to be a strong interaction between GVC firms and components of what is called the National Innovation System (Pietrobelli and Rabellotti 2011) in developing the knowledge required to advance in GVC production. What distinguishes this movement from earlier industrial policy is that it is concentrated on building capabilities in specific production segments of GVCs rather than across the board in a product sector, as was the case with earlier industrial policy.

Increasing the number of functions performed and thus the volume of work is a key part of the movement from low-income to middle-income status. A prime example of such a movement is Bangladesh. The garments industry, accounting for more than 25 per cent of GNP, has increased both the volume of production to become the second-largest supplier of export garments in the world, after China; it has also increased the number of functions to be a capable full package supplier. This movement has moved the economy from low-income to just about middle-income status. In recent times, Vietnam too has made such a move into middle-income status, though on a much broader front than Bangladesh.

Moving from assembly to full package supply often requires innovation, not of the major variety of new products but of processes to create or recreate already existing products. In the pre-WTO period, when India's patent laws only provided protection for processes and not products, Indian pharmaceutical companies developed the knowledge to reverse engineer pharmaceuticals, creating in the process a vast generic pharmaceutical manufacturing capacity. This was a significant step in developing the market for generic pharmaceuticals in the world, giving India the title of 'pharmacy of the developing world' as it produced and exported generic versions of, for instance, life-saving AIDS drugs. In similar manner India also became the world's premier vaccination manufacturer in the Covid-19 pandemic, though, ,other than one vaccine, the vaccines themselves were developed in the global North.

What we have seen above is that development in the supplier countries is not just a matter of accumulation but also capability development of both management and workers, along with knowledge acquisition, by learning by doing and firm-level R&D, with public sector support in training and acquisition of knowledge. In this manner, an economy could move from low-income to middle-income status. Is there, however, a linear progression from being suppliers to becoming headquarter

firms and economies, moving from middle-income to high-income status? In a nutshell, developing capabilities in production or the use of existing knowledge is relatively straight-forward compared to the creation of knowledge. This results in what has come to be called the "middle-income trap," reflecting the non-linearity of the process. We now turn to the middle-income trap and how it could be overcome, in particular, the discontinuity involved in building knowledge-creating capacity to overcome the middle-income trap.

THE MIDDLE-INCOME TRAP

The World Bank (2013) noted that some thirty countries had at that time achieved middle-income status but had subsequently failed to advance to high-income status. Since then, other economies from the global South, or supplier economies, have also taken such a step to middle income status. They include Bangladesh, India, Indonesia, Pakistan, the Philippines, and Vietnam. Some Latin American countries achieved middle-income status right in the 1980s and 1990s. Four important economies, however, did move from middle-income to high-income economies. They are South Korea, Taiwan, Singapore and Costa Rica. After that, Poland and some other East European countries have also made the transition to high-income (World Bank 2015).

The difficulty of moving from middle-income to high-income can be stated as follows: What happens after catch-up? After low-income countries have learned the methods of production of goods and services for the international market, after they have been able to build functional capabilities to move to full-package supply?

We have seen that low profits from GVCs and poor quality employment are associated with low-knowledge segments of GVCs (Nathan 2016). Thus, in order to increase both returns from GVC participation and the quality of employment, the problem is one of advancing from low-knowledge segments through middle-knowledge segments to high-knowledge segments of GVCs. The low-knowledge segments are those of assembly, while full package supply is a middle-knowledge segment, and design, brand, and marketing are the high-knowledge segments of GVCs.

Figure 1
Knowledge, profits and development

	Profits and Per capita GDP		
Knowledge bases of production segments	Low	Medium	High
Low	Assembly		
Medium		Full-package supply	
High			Design/Brand/Market

The figure above can be applied both at the GVC and national per capita GDP levels. An economy that is basically in assembly (we may add production of agricultural raw materials) will be a low-income economy. An economy that takes up full-package supply, which means it also includes assembly, will be a medium-income economy; while an economy specializing in design, branding, and marketing activities will be a high-income economy. In each step, the knowledge content of economic activity increases. This figure is adapted from Nathan (2018). A somewhat similar scheme of movement through GVCs, where the knowledge content, or disembodied content, as they term it, increases, is found in Kaplinsky and Morris (2001).

Milberg and Winkler (2013) find some evidence for this schematic analysis. They plot vertical specialization against per capita GDP and find that LICs are specialized as are HICs. It is the MICs that are least specialized: "…low-income countries seek to upgrade by reducing the overall level of vertical specialization (raising domestic value added in exports) and then reaching a point where rising incomes involves increased vertical specialization while focusing on the highest value added component of the GVC" (Milberg and Winkler, 2013: 308-09). I would amend 'value added component' to 'value capturing component', which brings in the elements of monopoly and monopsony power into the analysis of the distribution of value within a GVC.

The difference between lead and supplier firms in the production of goods and the monopolization of profits by the former are clear. So too, the role of own-brand GVCs in the movement towards high income status is clear. However, knowledge-intensive services can also play a role in this movement out of middle income, such as by Singapore, Taiwan, Hong Kong and, more recently, Poland (World Bank 2015).

In the matter of services, the differentiation is between, as in the case of IT services, companies that provide end-to-end services, including high-end consulting

and programming, testing and maintenance, and those who provide mainly the latter set of programming, testing and maintenance. This leads to very large differences in revenue per employee, which are $193,395 and $116,729 for IBM and Accenture, respectively in 2021; as against $55,229 and $45,300 for the Indian IT service majors, Infosys and TCS, respectively (all data from www.statista.com, accessed Jun 26, 2022). Clearly, a movement to high-value end-to-end consulting needs to replace the performance of subsidiary functions in order to support the movement from middle-income to high-income.

In the contemporary world, monopolized knowledge has been joined with the new global economies of hyper-scale (Nathan, 2020). Platforms, such as Google, with its protected search engine, and Facebook or Amazon, have established themselves as monopolies in more than one sector. Amazon is not only the largest retailer in the world, but also the biggest operator in computer cloud services. The platforms, with their combination of IP protection and global scale, have resulted in what has been called a "winners take all' economy (Giridhardas, 2018) and, as a consequence, have become a new source of unequal global development. Winners take all is a description of power law distribution, where a few get most of the income or profits and the very many just about manage to get by.

The important implication of the above analysis is that in order to make the transition from middle-income to high-income status the critical factor is the development of knowledge (Lee 2013). We add that what is required is knowledge which can be monopolized through intellectual property rights and thus become the basis of headquarter firms and also of high-value services. From being users of knowledge, supplier economies must become creators of knowledge. This has been accomplished by very few countries, such as South Korea. China is certainly moving in that direction as it develops its knowledge economy.

What is involved may be not just a general advance in knowledge creation but targeted at frontier technologies. Lee's Schumpeterian analysis of movement to high-income status points out that Korea and Taiwan were able to advance in "short-cycle" frontier technologies, such as consumer electronics and chip-making, where the capabilities required were different from and subject to less competition than in the older technologies (Lee, 2013).

In terms of knowledge, in dealing with the global knowledge divide, it is necessary to break the existing division of labour, between product monopolies of the Global North and manufacturing suppliers of the Global South; which itself

requires a movement from being users of knowledge, as manufacturing suppliers, to becoming producers of knowledge. This requires not just increasing the supply of highly educated workers, but also the demand for such highly educated workers (Rodrigo Arocena and Judith Sutz, 2010). The weak domestic demand for high-knowledge workers is seen quite vividly in the case of India, which supplies not just large numbers of high-knowledge workers to the global economy, but even CEOs of major US IT corporations like Microsoft, Google, etc, while itself having a low demand for these knowledge creators.

The demand for highly educated workers to create knowledge can be illustrated with a key indicator, that of expenditure on R&D as a proportion of GDP, a proxy indicator for the demand for knowledge creation. Table 6 below shows the clear divide between low-income, middle-income and high-income countries.

Table 6
R&D expenditures by country groups

S. No.	*Economy Group/Country (1)*	*R&D Expenditures as % of GDP 2010-18 (2)*
	Low Income	-
	Lower Middle Income	0.58
	Upper Middle Income	1.75
	High Income	2.59
	India	0.65
	Brazil	1.26
	South Africa	0.83
	China	2.19
	Korea	4.81
	USA	2.84
	Germany	3.09
	Japan	3.26

Source: World Development Indicators, 2020, Science and Technology, http://wdi.worldbank.org/table/5.13

What the above notes is formal R & D expenditure. It does not include the countless knowledge creations and innovations, possibly mainly in improving production processes. These are of the type called jugaad in India and are of the tinkering variety. They, however, do not fall into the category of knowledge that can be monopolized or provide excess profits. R & D expenditure is a rough indicator of the country's overall science establishment, which itself is part of the overall knowledge economy, embedded in the socio-economic system. What

remains to be analyzed in a next step is "how some actors in the global economy manage to "enclose" high-value technological knowledge" (Appadurai, 2022). The monopolization of knowledge through intellectual property rights is the instrument for such enclosure; the processes lead to such enclosure in a globally connected economy need to be identified. They include not just extrinsic but also intrinsic processes (Renn 2021) that would include, among other things, the reorganization of supplier economies, a large agenda that the author expects to take up subsequently.

Expenditure on R & D is for the creation of new knowledge, whether incremental or more basic. There is a clear correspondence between R & D expenditure as a percentage of GDP and income status in Table 6; but this is a two-way relationship, with increasing R & D expenditure also necessary to increase income status, particularly for low-middle income countries. China, with a R & D to GDP ratio of 2.19 percent, higher than the average for upper-middle income countries, and close to the average of 2.59 percent for high-income countries, has a clear policy of moving from knowledge utilization to knowledge creation; just as Korea, Singapore, and Taiwan did earlier. Brazil, India, and South Africa, on the other hand, are all lagging behind in investment in knowledge creation. But there too, things are changing, as shown by the creation of Covid-19 vaccines in both India and South Africa, besides China. We look now at how the global order is changing.

The Global Innovation Index (GII) crafted by the World Intellectual Property Organization (WIPO) bears out the changes that are underway (WIPO 2021). China ranks 12 overall and 1 in the upper-middle income group, while India ranks 40 overall and second in the lower-middle income group, where Vietnam ranks above India (WIPO, 2021: 4).

In the regional pattern, the WIPO report points out that Southeast Asia, East Asia, and Oceania are the only regions that are closing the gap with North America and Europe in the GII. WIPO, however, points out that the innovation landscape is changing in middle-income countries, with China, Turkey, Viet Nam, India and the Philippines, in that order, advancing in the innovation landscape. On the other hand, Latin America does particularly poorly, with only Mexico having consistently increased its ranking over the past 10 years. This picture is what we would expect given the long relative stagnation of Latin America in the middle-income trap, while East Asia is catching up with North America and Europe, and a few other middle-income countries, like Turkey, Vietnam, India, and the Philippines, are also moving ahead.

CHANGES IN WORKFORCE COMPOSITION

Moving into knowledge creation and innovation as against just he utilization of commoditized knowledge would impact the structure of the workforce. Where pre- and post-production tasks dominate the role of firms there would be a corresponding increase in the proportions of skilled workers and those with higher education. For example, the information and communication industry (ICT) exists in both the US and China, but the workforce compositions in these two countries are diametrically different: while the proportion of high-skilled workers in the US was 45%, it was only 10% in China; at the other end of the skill spectrum, the proportion of low-skilled workers in the ICT industry in the US was 10%, while it was 45% in China (see Table 7 below).The difference in the distribution of skilled workers across the same industries across the US and China, however, is not a static structure and is fast changing as China forces its way into the set of economies with large numbers of headquarter firms.

Table 7

Percentage Distribution of Skilled Labour in the US and China, 1995-2000

		Low-Skill	*Medium-Skill*	*High-Skill*
All Industries	USA	10	50	30
	China	65	30	5
ICT	USA	10	45	45
	China	45	45	10

Source: Approximations from Figures 2.21 and 2.22 Degain et al (2017: 58-59)

This would surely have changed as China developed more headquarter firms, such as Huawei and ZTE, in the ICT sector.

Along with this a rise in wage rates, brought about by the growth of employment in manufacturing and modern services, along with the exhaustion of national or regional labour surpluses, characterized as the Lewisian turning point (see Fang 2008 for China), leads to the reorganization of value chains. Initially. South Korea, Hong Kong and Taiwan led this reorganization through sub-contracting production to low-wage China, while firms in these countries went up the value chain. With wages in China going up, it too has been implementing policies of 'go up', 'go out', and 'go west'. Suppliers in China have been encouraged to sub-contract manufacture to other countries, for instance, Cambodia, Myanmar and Vietnam besides the 'go West' to low-wage regions in western China (Zhu, 2018).

The transformation of the workforce in becoming a new headquarter economy is dramatically seen in the case of South Korea, where the proportion of workers with tertiary education has gone up to as much as 98 per cent (see Table 8 below). The table also shows that China is in an intermediate position, while India and the Philippines lag behind. In understanding tertiary education enrolment in both India and the Phlippines, we should note the distinction made above between supply and demand for knowledge workers, where both India and the Philippines are substantial exporters of college-educated workers.

Table 8
Tertiary enrolment in 2021

India	29%
Philippines	36%
China	58%
Korea	98%
Germany	74%
UK	66%
USA	88%

Source: World Bank, 2022, World Development Indicators, https://data.worldbank.org/indicator/SE.TER.ENRR, last accessed July 10, 2022.

We now turn to some international features of the emergence of new headquarter firms based on knowledge creation.

TECHNO NATIONALISM[2]

Moving into knowledge creation and using that to develop enterprises will inevitably mean competition for markets between old incumbents and newcomers. In these struggles for dominance, for instance, in the platform spheres, the big players headquartered in India or China have received support, directly or indirectly, from their respective states. When Uber sold out to the Chinese taxi service, Didi Chuxing, the sale was reported to be orchestrated by the Chinese government (Jannace and Tiffany 2019).

This has been objected to as techno-nationalism and the movement from the rule of law to one of rulers (Jannace and Tiffany 2019). Of course, the law here is TRIPS, which is part of the WTO's articles of membership. Techno-nationalism, defined as "government action in support of high-tech industries" (Ostry and Nelson 1995, 61), is not something new. The U.S. state played a role in the rise of

2 This section is adapted from Nathan, Kelkar and Mehta (2023).

American technological leadership, as shown in detail by Marianna Mazucatto (2011) and continues to be part of American policy. The EU's "Europe First Policy" (Ernst 2012) is a form of techno-nationalism, where the relevant geography has been extended from relatively small European nations to the European Union in order to be able to utilize economies of scale, which are important in platform economics.

Techno-nationalism has been part of development policy for late-comers. On the other hand, technology leaders have tried to stop this by insisting on the adoption of market fundamentalist policies by developing countries and the abandonment of nation-based technology policy, which Ha Joon Chang picturesquely characterized as "Kicking Away the Ladder", after having ascended it (Chang 2013). For instance, in order to catch up, the USA did not enforce British or German patents or copyright in the 19th century (Brander and Vertinsky 2017), leading to the apt characterization of nineteenth century USA as a "pirate nation" (Vaidhyanathan 2017: 13). Later, as US firms developed their own technologies, the USA started insisting on the strict application of patent laws. Non-acceptance of patents by low and middle-income countries, however, is no longer possible as acceptance of IPR protection under TRIPS is a condition of being a member of the WTO. Nevertheless, states have continued to find ways around TRIPS regulations.

For instance, China, has erected substantial barriers to non-Chinese platforms in digital international trade. The story of keeping Google or Amazon out of China so that Baidu (a search engine) and Alibaba (an e-commerce portal) could develop is well-known. However, it is not just China that is taking such nationalist actions. The USA, EU, and China have all taken steps leading to the evolution of "separate and not entirely compatible" digital regimes (Manning 2019, 4). Now, not just India and Russia, but Vietnam and Indonesia are also following suit to build their own digital regimes.

India is formulating digital rules that would support Indian platforms. The new (still in draft form) rules require online platforms, whether in e-commerce, travel, hotels or any other service, to give an Indian alternative for every transaction (*Economic Times* 2021). The rules also ban flash sales by e-commerce platforms. This would affect both Amazon and WalMart/Flipkart, which have built business models dependent on flash sales. Rules of access to social media platforms have been framed in a manner that would enable the Indian state to acquire access to any required information about the origins of messages, affecting WhatsApp, which depends on the privacy of its end-to-end encryption. Data localization is

another policy that favours national over international platforms. Many of these restrictions are couched in terms of national security, bringing about a marriage between national security and national business strategy.

In India there are not just techno-nationalist policies, but also rules that could favour one conglomerate over another. The draft e-commerce rules would not allow platforms to trade in products of their own companies. This would not allow Tata to use its many consumer-facing companies; while it would not be a disadvantage to Reliance, which does not have many such consumer-facing companies (Mukherjee, 2021). When a Tata spokesperson opposed the new e-commerce rules a Union Minister branded them as being against the national interest (Goyal, 2021).

There are two points about techno-nationalism. First, it is an inevitable part of development policy, as late-comers try to catch up with tech leaders. Such catching up cannot be accomplished or even attempted in the absence of a close relationship between the state, firms, and technology policy (Mazzucato 2011). Secondly, however, in a capitalist world economy, such catching-up is only a prelude to expansionism. Capital will seek to expand and must necessarily cross national borders; the intellectual monopoly capitalism of headquarter firms in both established and emerging headquarter economies reinforces this expansionist feature. It is the development of the knowledge economy that enables the creation of new, emerging headquarter economies and their expansionist moves that combine economic with political, military, and even soft cultural power.

Therefore, after having secured its own national technological platforms, China is now attempting to expand its role and influence in the world economy. Its own digital technology leadership in 5G mobile technology, which has brought it into conflict with the USA, is now being used to build what the Chinese call the Digital Silk Road.

India has also been moving on the road of digital tech-nationalism. Many actions hve been taken against Chinese companies in India, including the banning of TikTok. Recently the Indian Government has charged Vivo, the Chinese mobile phone supplier, with illegally repatriating about $8 billion in profits. As an editorial in an Indian economic newspaper commented the "the government seems to be using reprisals against Chinese investors in India to solve the border problem" (The Mint, July 11, 2022). Government actions against Twitter have triggered the incubation of the Indian start-up, Koo, as a counter to Twitter. Koo is still tiny in comparison to Twitter, but having established a foothold in India, Koo is attempting to expand

into Africa, where the Nigerian government has banned Twitter, which had taken action against its President's account. Ola, the Indian taxi platform, and OYO, the Indian hotel platform, have both expanded into other countries. Therefore, they have become regional firms, if not global ones. Of course, many of the established Indian conglomerate-headquarter firms are now global players.

In this movement from nationalism to expansion, the new players also combine monopoly with monopsony. Leading firms set up their own zones of monopsony and compete with each other, as is obvious across Africa. With the disruption caused by the ongoing global recession, the various world powers and their headquarter firms are trying to create regional groupings that they can expect to dominate. In this development, it is not possible to draw a Chinese wall to separate nationalism and expansionism. And, in a capitalist system, it is inevitable that expansionism would follow successful tech nationalism, particularly when the new types of platform-based hyper enterprises are created, which have the enormous advantages of hyper scale.

Such expansionism and the defence of entrenched positions have become part of the geo-strategic struggle to redraw the contours of the world. GVCs are also being recreated in this context, such as the movement out of China, which is not only a reaction to higher wages in China but also stems from the US and others' strategic need to reduce reliance on China. The US and its allies are trying to relocate their value chains. Given the cost effectiveness of off-shoring to low wage areas, the value chain movement is unlikely to result in onshoring within the US, but more likely in what Janet Yellen, US Secretary of the Treasury, called 'friend-shoring' (Rajan, 2022). This has been accompanied by a renewed US emphasis on Latin America, surely a reserve of surplus labour that could replace some of the US value chains that now touch down in China. The multi-polar globalization that is now visibly growing does not mean the end of conflicts; rather, it would only intensify geo-strategic conflicts as each new pole jostles with older poles to try to make its own space in areas now under established poles.

CONCLUSIONS

In this paper, we identified three sources of growth for global South economies, which are intertwined with the global North in terms of labour and knowledge. The first is of growth largely within the contours of the existing division of the creation and use of knowledge, concentrating on the use of relatively commoditized production knowledge and growing in scale. The second is the development of managerial and

labour capabilities in taking on more functions in the advance from straight-forward assembly to full package supply. In this vertically-specialized industrialization the monopoly-cum-monopsony character of the global economic structure restricts profits and thus the extent of accumulation in the supplier economies. Household savings reduce the constraint of firm profits as a source of accumulation. In addition, public and private sector investments in the knowledge economy enable the build-up of capabilities in catch-up industrialization. Accumulation and adaptation, through the development of non-trivial though incremental capabilities, could, and often have, enabled the movement from low-income to middle-income status. That, in a sense, completes catch-up industrialization.

The movement from middle-income to high-income status, however, involves the development of headquarter firms based on the third source of growth, the creation of monopolized knowledge. This requires a qualitative change in the knowledge economy, from an emphasis on learning to use knowledge to the creation of knowledge that can be monopolized and necessarily combined with monopsony, as the new headquarter firms, with support from their states, build their own global value chains.

Thus, with such monopolized knowledge there is the creation of headquarter firms, that can earn excess profits, and high-value services. This is the major discontinuity, or non-linearity, in the process of vertically-specialized industrialization. It is this necessity for a strategy and investment in the development of the knowledge economy that introduces a non-linear dynamic into the model of vertically-specialized industrialization. While such a development of the knowledge economy will have a substantial element of techno-nationalism, its success also becomes the basis for geo-strategic competition for spheres of influence, investment, and markets, pitting emerging against older, established headquarter firms and economies and the emerging economies too against each other, as they try to build their own zones of monopoly and monopsony.

The world is clearly in the throes of such an ongoing struggle for the redistribution and defence of spaces of domination, adding this violent conflict to the crisis of climate change. The inter-twining of these two crises is seen in the energy struggles around Russia's war in Ukraine, which has already pushed many countries to increase reliance on coal-fired energy (Sarkar 2022). This makes it all the more urgent to search for sustainable alternatives to capitalist development of the current monopoly-cum-monopsony variety. Since the basis of monopoly-cum-monopsony

capitalism is the monopolization of knowledge through the system of intellectual property rights, it would suggest that an alternative could be created by changing the system of intellectual property rights that now produces pervasive monopolies. Could one fashion a knowledge economy that, while providing incentives and recognition for the creation of knowledge, turns the resulting knowledge into a public good rather than its current monopolization as a private good?

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