

GLOBAL VALUE CHAINS: THE RISE (AND FALL?) OF DEEP GLOBALISATION

To be published in Spanish Papeles de Europa, Summer 2023

Introduction

In 1957 the Russians surprised the world and launched the first satellite into orbit. The Americans, reacted to this unexpected development with a massive expansion in the training of scientists and technologists. If this rate of expansion would have been sustained over the decades, by 1992 there would have been two scientists for every man, woman and dog in the USA (Freeman, 1993). Beware the danger of extrapolating into the future the trends of the moment!

And so it is with respect to the future extension of Deep Globalisation and Global Value Chains (GVCs). I will argue in this paper that not for the first time in history, the advance in the degree of global trade integration will be arrested, and will decline. The role played by GVCs will reduce and to some extent be replaced by the growth of Regional Value Chains. This analysis will be pursued through the lens of the theory of techno-economic paradigms. I will argue that the expansion of Deep Globalisation in the latter quarter of the twentieth century was a consequence of the maturation and atrophy of the Mass Production Techno-economic Paradigm. The paradigm now diffusing rapidly through the global economy (the Information and Communications paradigm) will be characterised by a transition from a centrifugal to a centripetal trajectory of global production and trade. This does not mean the end of globalisation per se, but a shallowing of the trade element in globalisation. However, the manner in which this transition occurs and the form of globalisation which emerges is subject to contestation. The degree to which this transition will provide for a more sustainable world will depend on the balance of forces imparting Directionality to this historically significant transition.

The paper begins with a discussion of the theory of techno-economic paradigms. This will be followed by analysing the emergence of the most recent wave – Mass Production – and the role played by GVCs, particularly after the mid-1980s. The various types of value chains will be described, as will the dominant modes of innovation and upgrading which have occurred in the context of the evolving global division of labour. I will also consider the impact of GVCs on inclusion and the environment. The discussion will then turn to the fracturing of the Mass production paradigm, and the stabilisation and decline of the share of GVCs in global trade. The paper concludes by describing the character of the succeeding techno-economic paradigm (the ICT paradigm) and argues that whilst this will not lead to the collapse of globalisation, it will change its nature. Finance, investment, knowledge, technology and values will continue to diffuse globally, but production will increasingly be brought closer to consumption. Insofar as cross-border value chains will continue to expand, these will be predominantly regional rather than global.

Techno-Economic Paradigms Explain Surges in Economic Growth and Societal Organisation

Henry Ford's introduction of the Model T in 1908 and subsequently the moving production line in 1913 was a transformative moment in the shaping of the 20th Century global economy. Prior to these innovations auto production in the US resulted from a myriad of small plants – in 1895 1,900 companies produced more than 3,000 different cars. The introduction of the Model T in 1908 offered a robust design with interchangeable parts, and the moving production line allowed for mass production. The final product was standardised ('available in any colour as long as it was black') and the production line was organised around the specialisation of tasks. In turn, this specialisation of tasks allowed for greater mechanisation.

Together these innovations resulted in the reaping of massive economies of scale. Between 1909 and 1916, the price of the Model T fell from \$825 to \$345 (from \$24,270 to \$7,933 in 2020 prices) and further to \$260 (\$3,918 in 2020 prices) in 1925.¹ Between 1912 and 1927 Ford produced more than 15m Model T cars. It became the overwhelmingly dominant global car producer and by the end of the 1920s, Ford and two other companies (General Motors and Chrysler) accounted for more than three-quarters of total US car production.

A key element of Ford's moving production line was the internalisation of production within a single plant. The Highlands Park factory – at the time the largest factory in the world - comprised 1.5 km² of factory floor space. It had its own docks to unload ore, coal and other raw materials as well as 100 miles of internal railtracks. Crucially, unlike other auto manufacturers, the complete car (final assembly and all components) was produced within the plant.

So significant were these reductions in price and improvements in product that the principles of mass production (product standardisation, the moving production line and the internalisation of component production) diffused rapidly to other auto manufacturers and then began to spread to other sectors and other countries. During World War Two the mass production line was fine-tuned. For example, applying the principles of mass production to aircraft manufacture, the number of combat planes produced in the USA increased from 1,771 in 1939 to 37,861 in the first eight months of 1945, that is from less than five per day to more than 150 per day.²

The fusion of these principles of mass production with mass consumption (achieved through suburbanisation, infrastructure-building and incomes augmented by social security) resulted in the maturation and extension of the Mass Production techno-economic paradigm (Kaplinsky, 2021). At its high point it resulted in what has come to be referred to as the post-war Golden Age - between 1950 and the late 1970s the major industrial economies grew at a higher rate than any preceding (or indeed subsequent) period of history.

¹ https://en.wikipedia.org/wiki/Ford_Model_T. I have updated the wikipedia data from 2017 to 2020 prices, using US Bureau of Labor statistics.

² https://en.wikipedia.org/wiki/United_States_aircraft_production_during_World_War_II

The rise and subsequent fall of what I will refer to as Deep Globalisation can be understood through the lens of the rise and fall of the MP TEP. So what do we mean by the term TEP, and how does MP nest into this concept?

The theory of TEP builds on the recognition that since the industrial revolution in the first part of the 18th century, there have been a series of unfolding ‘waves’, ‘surges’, ‘long cycles’.³ Each of these waves lasts approximately six to eight decades and each involves a series of sub-phases. It begins with the invention of a core ‘heartland technology’ (sometimes referred to as ‘general purpose technologies’). This is followed by a frenzy of excitement as the financial sector spots the potential offered by the new technology and the resultant over-excitement results in a financial crisis (a ‘bubble’). Once this crisis is resolved the new paradigm deploys and spreads throughout the economic and social system and transforms the manner in which production occurs, the character of infrastructure and trade, how society is organised, patterns of residence and consumption, and culture and values. Over time the potential of the heartland technology is exhausted and productivity and growth slow down. At the same time, beneath the radar, the core inventions which will power the new paradigm emerge.

The first of these cycles (1750-1830) was the spread of the factory system, the mechanisation of production through the introduction of water power and the building of canals which allowed producers to reach more distant markets. The second wave (between 1830 and 1870) was dominated by the introduction of steam power, the growth of manufacturing towns and cities (no longer did production have to occur near sources of water power) and the building of railroads which allowed markets to be penetrated which were beyond the reach of canals. The third wave (1870-1920) saw the widespread deployment of steel, heavy engineering and electric power which spread through the economic and social system. Ships, telegraphy and the further development of railroads allowed for even more distant markets to be reached, and for inputs to be sourced from around the globe. The fourth wave, Mass Production, dominated the twentieth century, originating with Henry Ford’s Model T moving production line and realising its full potential during the post-war Golden Age between 1950 and the late 1970s. We are now witnessing the deployment of the fifth wave- the Information and Communications Technology TEP.

As observed, the TEP (which, to be more accurate should be termed the ‘socio-techno-economic paradigm’) involves a systemic complementarity between the core heartland technology and social organisation. During its successful deployment phase there is a ‘synergistic fit’ between the economic and the social, but when the wave reaches its mature phase and productivity growth slows down, there is a growing clash between the social embers of the dying wave and the social determinants of the new long wave. But before we proceed to examine the rise and fall of Deep Globalisation and within it the role played by GVCs it is necessary to first fill in two parts of this historical story. (For more detail, see Perez 2002 and Kaplinsky 2021).

The first is to briefly explain what is meant by the idea of a heartland technology and why it has such a transformative impact on the economy and society. As Freeman and

³ This analysis draws on my recent book Sustainable Futures, 2021) which in turn draws on the analysis of a neo-Schumpeterian theory of techno-economic paradigms elaborated by Freeman and Perez (1988), Freeman and Louca (2001) and (Perez 2002 and 2010).

Perez showed, there are four major types of productivity- and growth-enhancing innovations. The first are minor changes which occur incrementally and on an everyday basis within the processes of production and everyday life. The second type is radical innovations such as nylon (which substitutes for cotton) and nuclear power (which substitutes for carbon). Each of these innovations represents a category departure and advance from historic technologies, but each has a limited reach to a specific sector. Third are systemic innovations which have a transformative impact not just on a single sector but on a series of related sectors – the development of the chemical industry in the second half of the nineteenth century and biotechnology in the current phase are examples of this important category of innovations. But beyond these various sets of technologies exists the family of what I refer to as ‘heartland technologies’. These are systemically transformative and in the words of the Austrian economist Schumpeter involve ‘gales of creative destruction’. They simultaneously sweep away the existing dominant technologies (‘destruction’) and lead to the development of new, transformative and disruptive innovations (‘creation’).

The reasons why these heartland technologies are systemically disruptive is because they are characterised by four core elements – they offer the possibility of new products and major improvement in productivity across the reaches of economy and society; they are characterised by a sharp and prolonged reduction in price; they are in unlimited supply; and, crucially, they have applications across the range of economic and social activities.

The second explanatory element concerns the crucial role played by infrastructure in the matching of production and consumption in each of these waves. Adam Smith pointed out that the key to productivity growth lay in the division of labour (as, reflected in Ford’s moving production line). He also argued that the degree of the division of labour was determined by the extent of the market – the larger the market the greater the scope of specialisation. So in each of the waves we can see the complementarity between the demands and potentials of the heartland technology and the infrastructure which made it possible to reach larger markets – factory organisation, water and canals; steam power and railroads; steel, electric power, ships and telegraphy; and the automobile, highways, containerised transport, ports and airports.

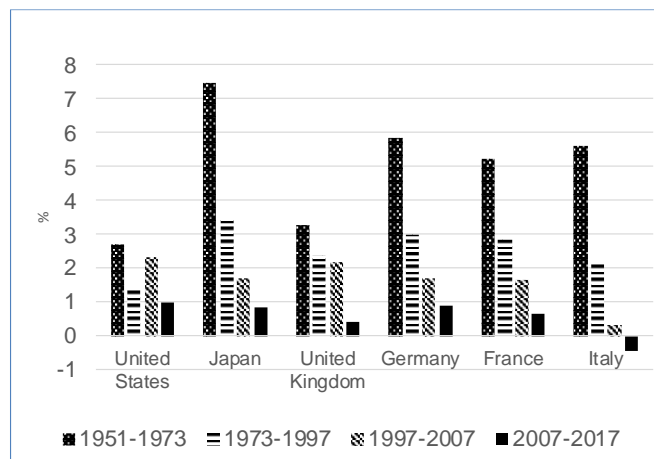
During the third wave – the second half of the nineteenth century – links between national rail systems, steel ships and telegraphy led to what Baldwin refers to as the ‘first great unbundling’ (Baldwin, 2016). Producers in Europe and North America were able to satisfy consumer demand and to source material inputs from across the world. During the ‘second great unbundling’ (Baldwin, op cit) in the latter half of the twentieth century, this global division of labour extended. But as we will see below, it took a different form. It is interesting that the aggregate measure of global integration - the share trade in of global production - at the end of the nineteenth century was similar to that at the end of the twentieth century. Between the two phases of unbundling – the 1920s until the 1950s – the degree of global integration fell. We will return to the significance of this trend later in this chapter.

Rise and Fall of the Mass Production TEP

What had begun with the introduction of mass production in a single firm in the productive sector resulted in profound and sweeping changes in economic, social and political organisation. The post-war Golden Age delivered historically unparalleled rates of economic growth – not just in North America and Europe – but in much of the global economy. But good things generally come to an end and, after the early 1970s, this widespread and sustained growth surge slowed down. Between 1961 and 1973, the US economy grew at an annual rate of 4.6 percent and that of Europe at five percent; subsequently, economic growth in both regions fell to an average of around three percent and collapsed further to around one percent between 2006 and 2017.

A critical factor underlying this falling rate of economic growth was a prolonged decline in productivity growth. With the exception of a brief IT-led boom in the US between 1997 and 2006, labour productivity growth fell and continued to fall throughout the high-income world after the early 1970s (Figure 1). This was for a combination of reasons. The efficiency gains resulting from the extension of the Mass Production paradigm tailed off as a consequence of declining marginal productivity growth within the productive sector and the growing tertiarisation of economic structure (service sector activities are more difficult to mechanise). Further, the reliance of the MP TEP on the automobile provided oil-producers with a significant degree of monopoly power and during the 1970s they used this to sharply increase the cost of oil.⁴ Coupled with declining productivity this led to a decade of stagflation – rising prices and very low economic growth. Not surprisingly, in the light of these developments, the rate of investment, which was a necessary driver of sustained productivity growth also declined. Associated with this falling productivity was a decline in the rate of corporate profits (Figure 2 for the USA; no equivalent data is available for Europe).

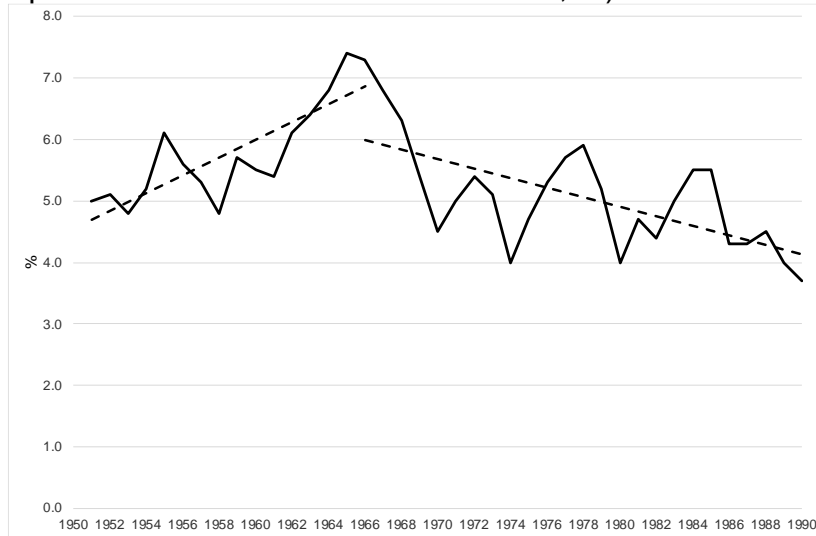
Figure 1: Labour Productivity Growth in Japan, USA, France, Germany, Italy and the UK, 1951-2019 (% p.a)



Source: The Conference Board (www.conference-board.org/data/economydatabase/total-economy-database-productivity)

⁴ This involved an interesting qualification to the idea of a heartland technology. Two of its attributes are that the technology involves falling prices and is in unlimited supply. For most of the twentieth century both conditions applied to oil. But during the 1970s, the OPEC cartel's intervention in the market restricted supplies and this led to a temporary decade-long increase in the price of oil.

Figure 2. US Corporate Profitability as Share Domestic Income, 1951-1966 and 1966-1990 (post tax profits as a share of domestic income, %)



Source: Calculated from <https://fred.stlouisfed.org/series/W273RE1A156NBEA>

Deep Globalisation and the Rise of Global Value Chains

Here lies the origins of Deep Globalisation which was driven by a combination of synergistic developments. The first, as we have seen, was the decline in corporate profitability which concentrated entrepreneurial attention on finding some remedy to reverse these trends. The second was the growing concentration in the retail sector, particularly in the US (Hamilton and Gereffi, 2009). As the sector consolidated in the 1960s, so the rising retail houses gained advantage by soliciting and assisting large-volume suppliers in the Asian Tigers (Hong Kong, Korea, Singapore and Taiwan). The third resulted from rising productive capabilities in Asia. Following a long period of prior industrial experience and heavy proactive industrial policies these economies possessed the capabilities to meet the demand from lead firms and large retailers in the US and Europe.⁵

And fourth, and perhaps most important, was the change in corporate strategy. To understand this development we need to remind ourselves of Henry Ford's decision to internalise production. Initially this was reflected in the Highland Park complex which internalised the complete production process in a single factory. And then, as the market grew, production was internalised within a single firm which had subsidiaries across geographical space. (For example, during the 1920s, Ford completely dominated auto production in the UK). The logic behind internalisation was that using external suppliers created problems (Williamson, 1985). Dealing with many suppliers involved substantial transaction costs. Further, in an era of arms-length and conflictual inter-firm relations, suppliers generally could not be trusted. Moreover, suppliers were reluctant to invest in costly innovations to meet the needs of a customer which might shift its purchasing to a competitor at any time.

This combination of factors resulting from the strategy of internalisation also exacerbated the decline in productivity and profitability. Changes in the nature of final

⁵ See Wade (1990) for the case of Korea and Taiwan.

demand added to these problems in production. After two decades of rapid growth during the Golden Age, the unmet post-war consumption needs of the population were satisfied in the large economies. Consumers no longer wanted 'a Model T Ford in any colour as long as it was black'. They increasingly expected variety and product innovation and firms unable to meet these changing expectations suffered from a combination of low product prices and falling market shares. The moving production line and internalisation could no longer meet these market needs satisfactorily. Here the key strategic innovations arose in the Japanese auto industry, and in the Toyota Corporation in particular (Hoffman and Kaplinsky, 1988). (This mirrored the pioneering role played by Henry Ford in the early twentieth century). Instead of seeking to internalise as much of production as possible, Toyota (and then its Japanese rivals) sought to outsource much of component production. Its role increasingly came to be one of design, systems integration and marketing. Hence it developed key organisational routines such as just-in-time manufacturing, total quality control and supplier development programmes. The latter strategy was particularly important in enabling the transition from internalisation to outsourcing. In place of lead firms engaging in arms-length and contestational relationships with suppliers, the trend was for long-term and more cooperative and interactive links across the value chain.

Initially this strategic transition involved outsourcing to local suppliers. For example, the core production locale for Toyota was Toyota City, an agglomeration of first-, second- and third-tier suppliers in a single city. This was widely copied across the auto sector in Japan and elsewhere and the 'Toyota Production System' (Ohno, 1988) subsequently spread across the spectrum of manufacturing sectors. But over time, logistics improved (containerised transport was especially important), information flows were digitised and suppliers became more competent (often aided by their own governments). Local outsourcing thus transitioned to global outsourcing.

Herein lie the origins of Global Value Chains. These resulted from a combination of an increasing division of labour, growing specialisation in core competences amongst lead production firms, the buying power of an increasingly concentrated retail sector, developments in transport and logistics, a revolution in corporate business strategies and growing productive capabilities in low-cost Asian suppliers. But none of this could have matured into a world dominated by GVCs without complementary changes in the architecture of global trade, and here we can see the synergy in techno-economic paradigms between the economic and the political.

The post-war period had seen the dominance of import substituting strategies in developing countries. These had in fact mirrored the inward-looking protected industrialisation response of the US and Europe during the 1930s when the degree of global integration fell sharply (Figure 7 below). However, after the 1970s, this global trade architecture was no longer functional to the evolving strategies of global outsourcing and trade expansion. And thus we can observe the rise of the neo-liberal Washington Consensus as national policies and the architecture of global trade and governance adjusted to meet the needs of the corporate sector. It required of the developing world not just that they open their markets to goods and services sourced from the high income countries, but also that they switch their strategic orientation from an inward focus to export oriented industrialisation. In other words they could become export platforms, low cost suppliers for outsourcing lead firms in the high income countries. Some developing economies – notably Hong Kong, Korea,

Singapore, Taiwan and then China – made this strategic transition enthusiastically. Others were forced into it as the Washington Consensus was rolled out across the developing world.

China's 'going out' policies adopted during the mid-1980s marked a particularly important transition and before long, 'China' rapidly became the manufacturer for the world. In fact this growing Chinese dominance masked a series of more important changes. For one thing, in the early stages China was nothing more than an assembler of outsourced intermediates acquired from other countries. For example, the iPhone 4 which retailed in the US for \$399 was exported from China for \$175, but only involved \$6.50 of Chinese value added (Xing and Detert, 2010). (In a more extreme case, the domestic content of 'shoes' exported from the Dominican Republic to the US in the 1980s was a mere 23 US cents; Kaplinsky, 1993). For another thing, what appeared to be 'Chinese' exports often involved regional value chains, that is a combination of capital goods and intermediates sourced from adjacent Asian economies.

As these value chains fractured and became increasingly specialised, so global exchange became increasingly dominated by trade in intermediate products and services. It was estimated in 2013 that intermediate products accounted for around 70 per cent of global trade (UNCTAD, 2013). Amongst other things this resulted in the anomaly of a substantial overvaluation of the degree of globalisation since many intermediate products were double- (and sometime treble-counted) in world trade; for example, the screen of an iPhone was recorded as an export from Korea to China and then recorded again in the value of China's exports of an assembled iPhone. UNCTAD estimated that this double counting inflated the total value of global trade by around 28 percent (op. cit.).

In the early stages of global outsourcing the primary driver of location was cheap labour costs. As can be seen from Table 1, if the value chain could be sliced into fine sub-processes which included labour-intensive tasks, there were substantial gains to be realised by shifting the labour-intensive components of the chain to developing countries such as to the Asian Tigers (Hong Kong, Korea, Singapore and Taiwan) in the 1970s and then to China after the mid-1980s. Despite the fact that some of these formerly low-cost export platforms saw a rapid increase in capabilities and wages, outsourcing chasing low unit wage costs continues to be a major driver of Deep Globalisation.

Table 1: Post tax wages in global economies, March 2009 (\$)

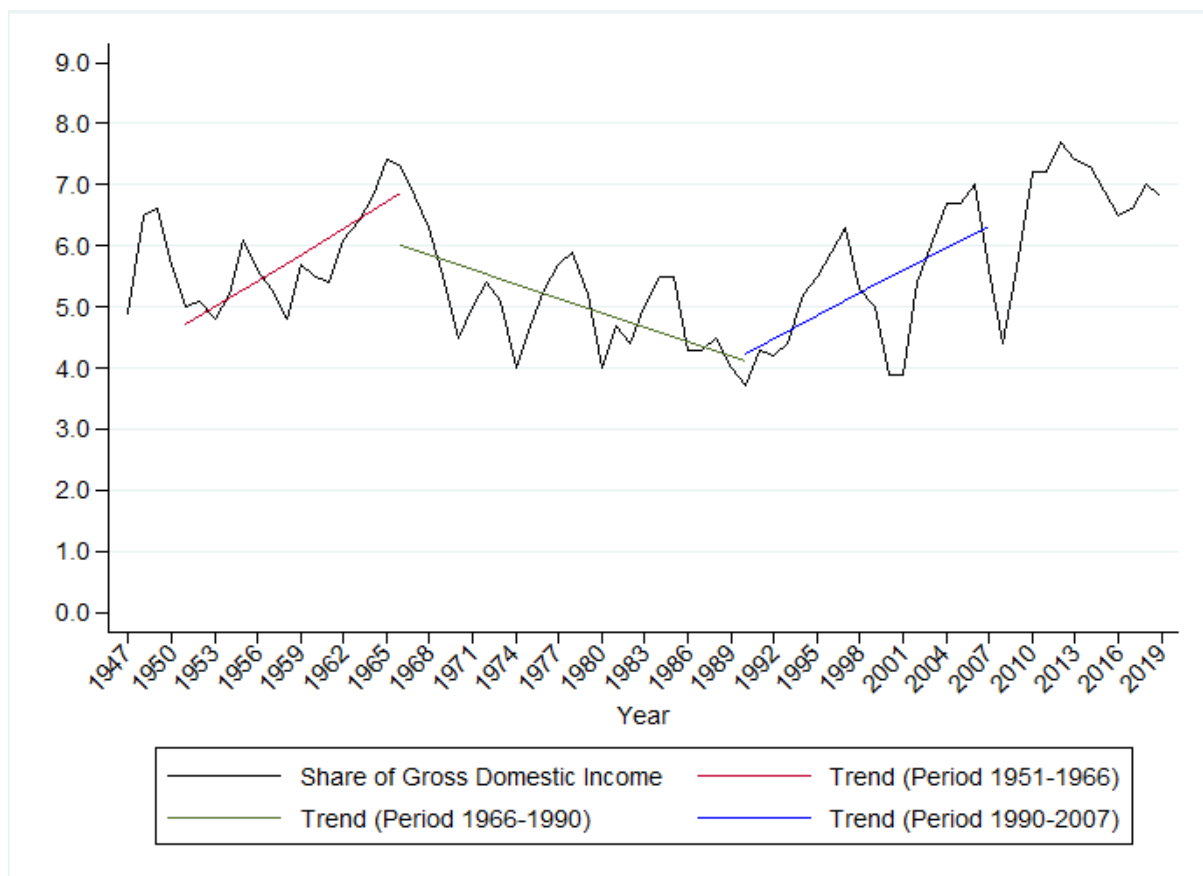
	Building Labourer	Skilled Industrial Worker	Engineer
New York	16.6	29.0	26.5
London	9.7	19.0	22.1
Beijing	0.8	2.3	5.8
Delhi	0.5	2.1	2.9
Nairobi	0.6	2.0	4.0
Ratio of Rich-Poor	20.4	10.9	5.8

Source: Selected from Milanovic (2012), p. 130

The knowledge intensity of production has increased across the spectrum of productive and service sectors. As firms have specialised in core competences, so the value chains in many products and processes - particularly those involving complex products such as aeroplanes, automobiles, infrastructure and pharmaceuticals - have become increasingly subject to 'slicing'. That is, the number of discrete links in the chain has expanded (WTO 2021). This resulted in increasing cross-border flows of intermediate products and services where trade is determined by technological competences rather than relative wages.

The development of Deep Globalisation 'saved' Mass Production. That is, the capacity to slice up the value chain and to take advantage of low labour costs globally led to a revival of profitability in the major industrial economies. Compare for example the trends in US corporate profitability shown in Figure 2 for the periods between 1961-6 and 1966-1990, with those between 1990 and 2007 (Figure 3). It is the primary reason why the Mass Production TEP lasted longer than each of the preceding waves – nine to ten decades compared to five to seven decades.

Figure 3: US Corporate Profitability as Share Domestic Income, 1990-2007 (post tax profits as a share of domestic income, %)



Source: Calculated from <https://fred.stlouisfed.org/series/W273RE1A156NBEA>

Types of Value Chains and Chain Governance

There is of course a wide variety in the character of GVCs. Whilst each chain is distinctive, it is nevertheless possible to identify main classificatory types. Gereffi's

pioneering discussion of value chains in the late 1990s distinguished between two major families – those where the primary power lay with buyers, and those where the power resided in firms towards the bottom of the chain (Gereffi, 1994 etc). As a general rule, chains involving single-use products or products directly consumed by final users (such as apparel, toys, footwear, furniture and electrical home-appliances) tend to be controlled by lead-firms at the top of the chain, often exercising their power through their control over brand-names. By contrast, technology-intensive sectors and those producing complex and durable products (such as electronic components, computers, heavy engineering) are more often controlled by firms at the base of the chain, with control often being exercised through proprietary knowhow and standards (such as Apple’s ecosystem which cuts across different devices).

Beyond the difference between buyer- and producer-driven chains lies the contrast between vertically-specialised chains (subject to the chain-splicing and specialisation described above) and additive value chains (Kaplinsky and Morris, 2015). In vertically specialised chains the drive to specialise in core competences generally motivates firms (and countries through their industrial policies) to thin-out their contribution in the addition of final product value (Figure 4). In additive chains countries the objective is frequently to deepen participation in the product’s final value. These additive chains are typically found in the resource sectors where the bounty of nature anchors extraction geographically and firms (and governments) seek to build on these resource rents to supplement their participation in resource extraction (Morris, Kaplinsky and Kaplan, 2012). They seek to augment the often intensely competitive extraction of resources by engaging in the processing of commodities (where oligopolistic markets tend to be more common and where resource rents can be exploited more effectively). The cocoa value chain is an example of the additive stages in resource-based industries (Figure 5).

Figure 4: “Thinning” out in vertically specialised GVCs⁶

⁶ The structure of this Figure was suggested by Will Milberg.

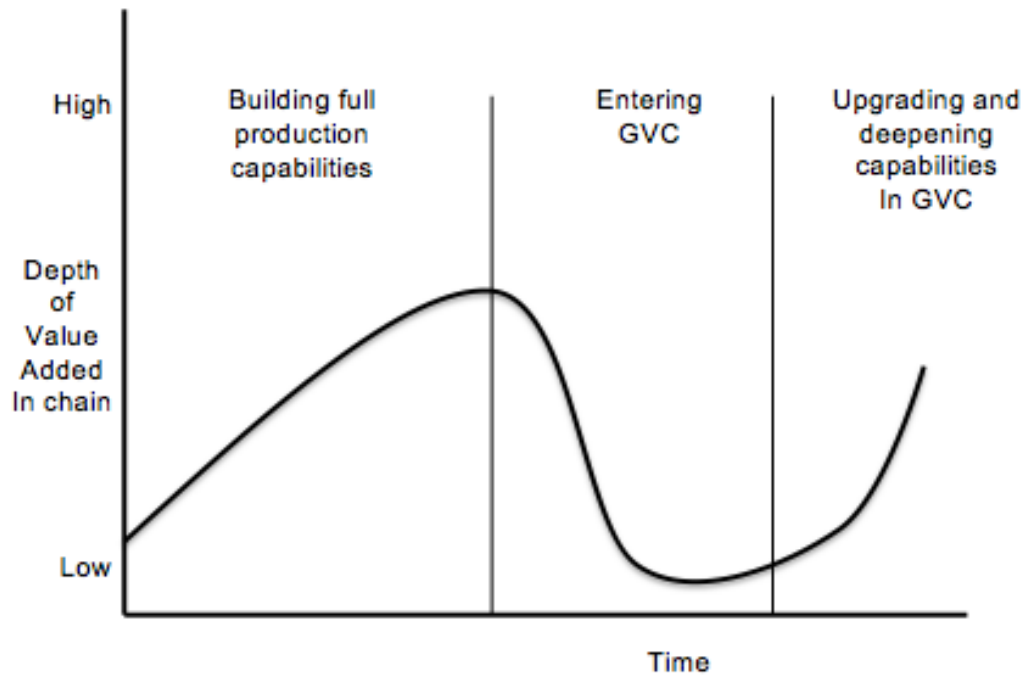
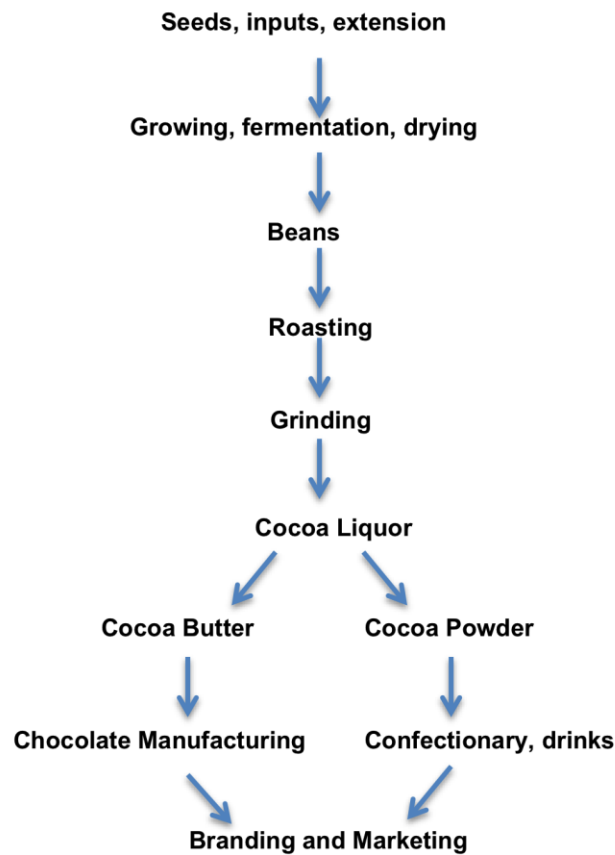


Figure 5. The Cocoa Value Chain



To varying degrees, power relations are a central component of all chains. The effective operations of GVCs which are spread across geographical space and which often involves myriad number of firms requires that these chains be 'governed'. The governance is required to coordinate complex logistics and to ensure that efficiency and innovative capabilities are endogenised across the chain (for a chain is always only as strong as its weakest link). Critically, governance determines the distribution of rents generated in the chain. Lead firms protect their rents through a variety of mechanisms (including intellectual property rights) and by defining who does what in the chain. For example, in the furniture sector, IKEA encouraged its suppliers to make their own innovations in process, which had the effect of lowering costs through innovation and heightened competition. However, all suppliers had to produce to IKEA designs, which were the source of IKEAs profitability (Kaplinsky, Morris and Readman, 2002).

Chain governance is not a binary fracture in global trade between exchanges which are wholly governed by impersonal market forces (that is, prices shaped by 'perfect competition') and production which is wholly internalised within the operations of a single firm trading within its own boundaries. In the former case, governance is absent; in the latter it is absolute. Instead, there is a spectrum of governance (Humphrey, Gereffi and Sturgeon, 2005). Between the two extremes of absent and absolute governance are different degrees of 'intimacy' and relational-longevity between firms in the chain, including structures in which lead firms actively work in and with their suppliers and customers. In addition, and particularly in chains with many layers of

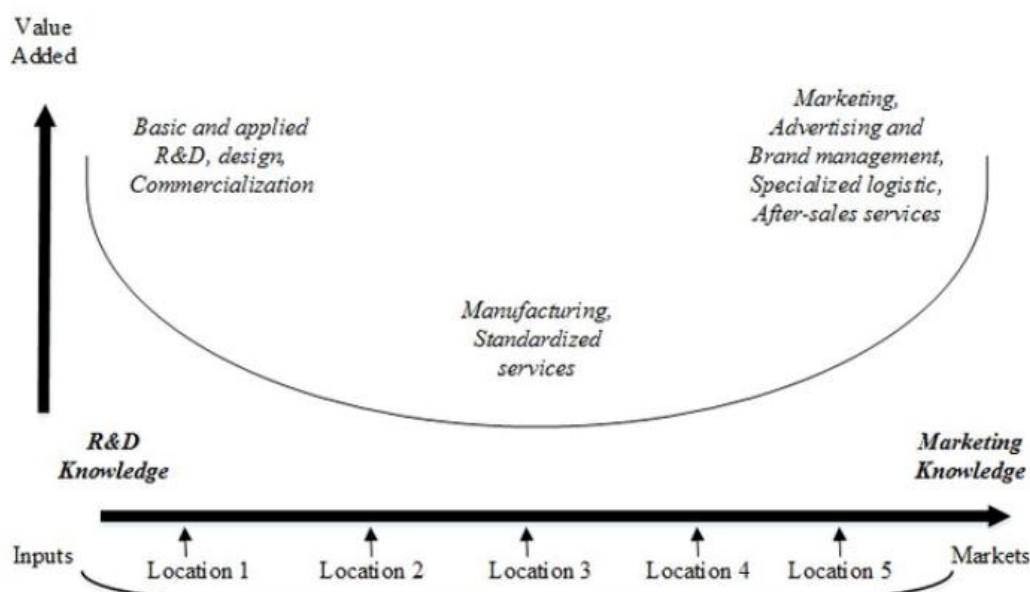
specialisation, there may often be ‘intermediary governors’. Gereffi refers to this as triangular governance in which the lead firm sets the parameters critical to the chain’s performance (for example, price, quality and brand) and an intermediary firm (such as Foxconn in the case of electronics, and Li and Fung in the case of apparel) plays the role of the system integrator (Gereffi, 1999).

Innovation, Upgrading and Positioning in GVCs

The roots to profitability lie in the capacity of firms to identify and exploit rents and to appropriate the super-profits which are generated by these rents (Kaplinsky, 2019). By rents we refer to attributes which are (relatively) unique to the firm and which are difficult to copy – the ‘core competences’ which we discussed in earlier sections. There are four main families of rents. The first are those which are bounties of nature – resource rents’, for example high-grade ore deposits. The second category comprises endogenous ‘Schumpeterian’ rents – that is, capabilities which are generated within the production process, for example, improvements in product and in process. The third involves unique competences which are exogenous to the process of production, for example actions by the state to ensure macro-economic stability and an environment supporting investment and an eco-system of institutions supporting innovation (the National Systems of Innovation – Lundval, 1992; Freeman, 1996). Finally, very large firms possess the capacity to limit competition through market power, restricting competition in both input and output markets.

Over time, and to varying degrees, each of these rents are eroded. New ore deposits are found, new firms emerge as effective innovators, more countries develop the supportive environment backing innovation, and monopoly market power is eroded. Not surprisingly, few of the firms which dominate the global economy remain dominant for more than a decade or two. There is considerable churn in the hierarchy of dominance and profitability. In this competitive environment, the key to sustaining profitability lies in the capacity to innovate. (referred to as upgrading in the value chain literature), and here we can distinguish four primary forms of upgrading (Humphrey and Schmitz, 2001). The first two, central to Innovation Studies, are improvements in product and process. The third arena for upgrading/innovation, first problematised as an analytical category by GVC researchers in the late 1990s, is what has come to be termed ‘functional upgrading’, that is changing the role played in the value chain. And this is of course the key characteristics of GVCs which we have documented above. The lead firms in the historically dominant northern economies ‘sliced’ up their chain, vacated the links in the chain associated with physical production (which were relatively easy to copy) and outsourced these to low-wage economies. In so doing they concentrated in the relatively uncompetitive links of design, branding, marketing and chain logistics links. This transition is characterised through the so-called ‘smile curve’ (Figure 6), initially developed in 1992 by Shih, the CEO of Acer, a Taiwanese firm which grew to dominate the assembly of laptop computers and other electronic devices during the 1990s and early 200s. (It’s competitive rents have now been eroded in these product areas by Chinese producers). The fourth category of innovation identified by Humphrey and Schmitz is moving to a completely new and less competitive chain, for example, Nokia’s transition from pulp, to rubber products to digital telephonic systems.

Figure 6. Functional Upgrading in GVCs – The Smile Curve



Hence the challenge of innovation/upgrading is central to the dynamics of GVCs. It explains how they developed and the factors driving the changing character not just of individual chains and sectors, but also the specialisation of whole economies. It also exemplifies how particular TEPs represent a synergy between the technological (the intensive use of ICTs in greasing the logistics of GVCs), embodied and organisational changes in the firm and between firms, and the macro (trade liberalisation, the rise of the World Trade Organisation and the growing dominance of the Washington Consensus in national and global economic and political policies). It also determines the distribution of rewards in global production with producers in the more competitive links in the chain (often the physical transformation of inputs into outputs) earning lower returns than those in the less competitive links (for example, design and branding) (Kaplinsky, 2019).

GVCs, Inclusive Growth and the SDGs

The global spread of GVCs in the era of Deep Globalisation has had significant impacts on the character of inclusion in global production. This is a large topic and there is no scope to consider this issue in detail in this paper. But three central elements are clear. The first is that at the global level, the locus of production has shifted dramatically in historical terms. In particular, the formerly dominant industrial heartlands in the northern economies have been devastated as production has been offshored to China and other low wage predominantly east Asian economies. Living standards have stagnated and often declined in the former industrial heartlands in the US and Europe and have grown markedly in China and a few other formerly low income economies. As a consequence, the aggregate number of global citizens living in absolute poverty has fallen sharply, almost entirely due to economic growth in China and its regional economies. This has meant that global economic inequality (that is

the distribution of income amongst all global population) has fallen at the same time that income inequality within individual economies (China as well as the US and Europe) has grown.

Second, insofar as firms and producers have been incorporated in GVCs, this has resulted in substantial upgrading in low income economies. Meeting the needs of demanding lead firms, buyers and markets forces firms to upgrade, and at the same time the extension of the 'Toyota Production System' (that is, assisting suppliers to meet the needs of buyers) in GVCs has provided a source of support to firms upgrading in the extended global supply chains.

Third, at the same time as GVCs and export-oriented growth have led to increased employment and incomes in firms and countries down the supply chain, it has had complex and contrasting impacts on skill-differentials and different components of the labour force.⁷ The globalisation of the apparel, horticultural and floricultural value chains have had a positive impact on the gender distribution of work and incomes. Notwithstanding the often highly exploitative condition in which many of these women work in assembly, it has provided them with the opportunity to escape the misogyny and tyranny of life in rural areas. Of course this is not a justification for low wages and often intolerable and unsafe working conditions in global assembly factories, but it would be an omission to not also reflect the positive impact this has had on the lives of women in many developing economies (Kabeer, 2000). An additional and important element in the changing character of work has been the exclusionary impact of GVCs on the illiterate and innumerate workforce. Participation in GVCs often requires a 'chain of custody' documenting the history of production through all links in the chain. This requires an educated labour force and has not only excluded the uneducated, but also informal sector firms who are unable to meet the required standards of documentation and improvement. Hence, as in the case of macro-economic impacts, the extension of GVCs has had complex and contrasting impacts on inclusion, exclusion and distribution.

Finally, as we observed above, each TEP is characterised by a complex relationship between the technical, the economic and the social domains. When the paradigm is deploying rapidly and is in a vigorous phase of deployment, values and lifestyles support the expanding production system. Thus, during the 1950s and 1960s, the mass consumption required to support mass production was reflected in the rapid expansion of suburbanisation and the growth of life-styles involving home automation and the increasing consumption of throwaway single purpose products (Perez, 2002; Kaplinsky, 2021). Moreover, at low levels of income, consumers did not much care about the work practices involved in the production of their consumer products, nor on the impact on the environment of production processes. But as consumer incomes grew in the major economies, so values and lifestyles began to alter. Increasingly, consumers were concerned with the provenance of the value chains underlying their consumption – was child labour involved? were workers paid living wages? did workers have the right of assembly? More recently, the rapidly unfolding climate crisis has led to concerns about the environmental impact of supply chains. Hence civil society organisations have pressurised the corporate sector for enhanced

⁷ A network of global researchers addressed these issues in depth. See <https://www.gdi.manchester.ac.uk/research/groups/gpn-trade-labour/capturing-the-gains/>

performance on ESG – the environment, the social and corporate governance. The value systems in contemporary high income countries no longer support crude forms of mass production in low and middle income country supply chains.

The Fracturing of Deep Globalisation

In the preceding discussion we analysed the rise of Deep Globalisation and the role played by GVCs through the lens of the rise and deployment of the Mass Production paradigm. The key elements of this systemic evolution of TEPs are as follows. First, the Mass Production TEP is one of a type, preceded by three earlier TEPs since the onset of the Industrial Revolution. Second, each of these TEPs involves a deepening of the division of labour and the spatial extension of the market for inputs and outputs. Third, each TEP involves an interrelationship between the technical, the economic, the social and the environment. Fourth, each of these TEPs is characterised by a vibrant deploying upswing and a decaying downswing. Fifth, when the TEP is deploying and on the upswing, this interrelationship is synergistic and complementary; during the downswing, there is a growing tension and conflict between the social, the environmental and the productive systems. Sixth, there is a temporal correspondence between the decay of an existing TEP and the emergence and tentative extension of the succeeding TEP.

How does the evolution of the Mass Production paradigm correspond to this framework, and what implications does this have for its future extension? And, within this, what implications does this hold for the future of GVCs?

As we have observed, the Mass Production paradigm originated in the early 20th century; it faltered (as all paradigms do – see Perez, 2002) during the Great Crash in 1929-1932, but Roosevelt's New Deal during the 1930s, the rapid expansion of the armaments industry during World War 2, the extension of the welfare state in Europe and the coupling of suburbanisation and automobilisation in the post-war period led to an historically unprecedented Golden Age between 1950 and the mid 1970s. Mass production was gainfully complemented by mass consumption and economic growth was no longer concentrated in the high income economies.

But as in previous TEPs, the full deployment of the paradigm eventually led to a decline in marginal productivity gains. Moreover, the heartland technology's dependence on oil added cost-pressures and exacerbated the impact of the productivity slowdown, resulting in a protracted period of stagflation. At the same time, the social infrastructure which supported the extension of the paradigm frayed – consumers tired of standardised products and the young generation increasingly began to adopt different lifestyles. Not surprisingly, in the face of these developments, corporate profitability began to decline. Absent the transition to a new TEP, Deep Globalisation through the extension of GVCs provided the 'escape route' for the Mass Production paradigm. Extending mass production to the global level allowed for cost reduction, both through the increasing division of labour and through access to low cost labour. It also provided a new market to support mass consumption. Critically, this global extension was underwritten by an architecture of global governance (notably a liberalised trade system organised through the aegis of the GATT and the WTO, and the often-enforced neo-liberal policies which opened up low income

countries to globalisation), extended systems of global infrastructure (notably facilitated by containerisation and IT-mediated logistics) and social and political structures in both the leading northern economies and southern economies which legitimated this extending global division of labour. The spatial location of production and consumption in this globalised paradigm is especially relevant to our discussion. Consumption and production were increasingly separated – in the extreme, towns and cities in China specialised in the production of single components for consumption across global markets.⁸

Many of these elements began to decay after the turn of the millennium. The ‘economic machine’, burdened and undermined by increasing financialisation, fell over and this resulted in the Global Financial Crisis in 2008-9. This was temporarily remedied with various sticking plasters, but the underlying fractures are barely beneath the surface. Consider, for example, the unsustainable levels of debt which currently suffuse the global economy. The share in global GDP of total private and public sector debt rose from 200 per cent in 1999 to 350 per cent in 2021 and 420 per cent in late 2022. In the US the share of debt was higher than in the Great Depression or after World War 2 (Roubini, 2022).

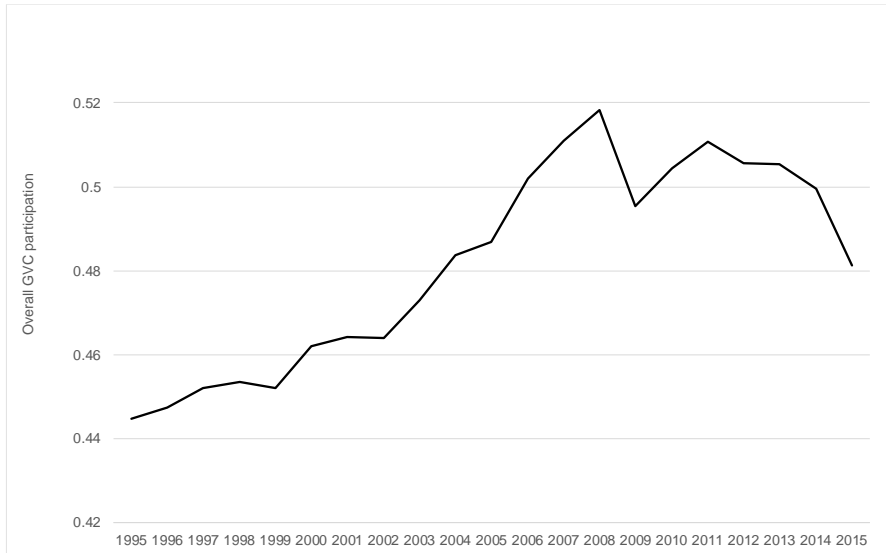
Critically, the political compact which supported Deep Globalisation increasingly fractured. When imports from low-wage emerging economies did not displace labour, they resulted in the stagnation of earnings amongst unskilled workers – real wages of unskilled labour in the US and in parts of Europe were lower in 2008 than they were in the early 1970s and were further eroded by the 2008 financial crisis (Kline, 2018). The combination of growing unemployment and stagnant and falling wages fuelled discontent with the social and political regime that had developed after WW2 to support the deployment of the Mass Production paradigm. Increasingly, the legitimacy of liberal democracy (which Fukuyama (1989) had claimed in ‘The end of history’ to have supplanted all other forms of political governance) was eroding. Fuelled by the rise in migration (in large part a consequence of the unevenness of global growth in mass production), this resulted in the rise of populist governments. The clarion calls of this populist movement in the world’s dominant economy – the US – was to retreat from the global free trade order, accompanied inter alia by the introduction of protectionist trade policies. As in the Great Depression in the 1930s, this was mirrored by the imposition of tariffs on US trading partners. It also led to sustained attacks on the Bretton-Woods institutions of global governance that had developed after WW2 to support the global deployment of mass production. The post-Trump Biden administration introduced a comprehensive industrial policy designed to decrease dependence on imports and GVCs (Tyson and Mendonca, 2023).

Reflecting these unfolding developments, Deep Globalisation reached its peak at the time of the Great Financial Crisis in 2008, after which the rising share of GVCs in global trade began to stabilise and retreat (Figure 7). As we observed in earlier discussion, this is not the first time that the share of global trade in global production has fallen. As can be seen from Figure 8, the share of trade fell during the latter phases of the ‘First Great Unbundling’ in the late 19th century, and particularly sharply between

⁸ For example, in 2012 Jinjiang in Fujian Province China has more than 5,000 footwear firms, employing more than 5,000,000 workers. It accounts for 20% of total global production of sports shoes and sneakers <http://www.economist.com/node/21552898>

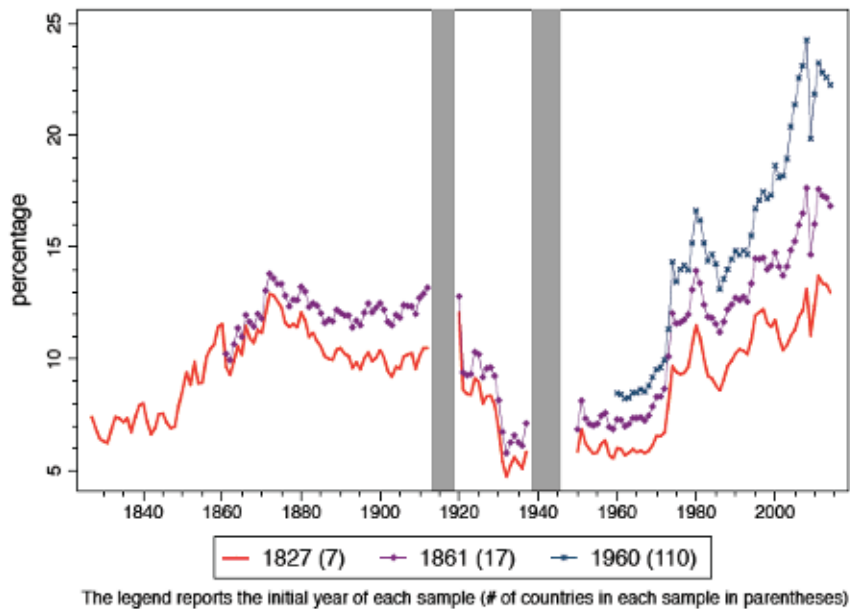
the two world wars. The degree of openness grew particularly rapidly during the Deep Globalisation in the last quarter of the 20th century. So, seen in historical terms, it is perhaps no surprise to see this changing structure of production and trade.

Figure 7. Share of GVCs in Global Trade (%)



Source: Calculated from World Bank World Development Report (2020)

Figure 8. Share of Trade in Global Production



Source: Fouquin and Hugot, 2016.

Given this increasing implosion of the Mass Production paradigm, what opportunities await global capitalism in the future and what implications will this have for the spatial character of global production and consumption? To answer this we need to return to the earlier discussion of TEPs and to emphasise two points in particular. First, each of

the paradigms is driven by a core heartland, general-purpose technology which amongst other things is not only highly disruptive (gales of 'creative destruction' was the phrase used by Schumpeter) but also has application across the whole spectrum of economic and social activity. Second, each of these revolutions involves a synergistic fit between the imperatives of the technology and the infrastructure used to acquire inputs and reach final markets. In each of the four TEPs since the Industrial Revolution this has led to an increasing spatial separation between production and final consumption. As Smith observed, the division of labour is determined by the extent of the market. This culminated in the extended GVCs of late Mass Production where much of global production was located in the East Asian region (particularly in China) and the bulk of consumption took place in the formerly dominant northern economies.

Here enters Information and Communications Technologies (ICTs). These meet all the requirements of being a heartland technology – disruptive economic impact, sharp descending cost, unlimited supply and (crucially) with applications across the whole range of social, economic and environment activities. Having its origins during the maturing phase of Mass Production, ICTs are now being deployed at a frenzied rate across the economy and society, and offer the opportunity for sustained profitable application in the future. In this regard their role is analogous to the diffusion of Mass Production after 1950. Provided with directionality, the ICT paradigm provides the opportunity for a new phase of economic, social and environmental sustainability (Kaplinsky, 2021).

But what implications does this new paradigm have for Deep Globalisation and GVCs? Here we can anticipate a reversal of the historical trend across the development and diffusion of TEPs which saw an increasing spatial separation between production and consumption. This is for three related characteristics of ICTs. First, they are labour-saving, reducing the competitive advantage of locating in low-wage economies. Second, at the level of the physical transformation of inputs into outputs, ICTs are not only descaling, but also provide the opportunity for mass customisation. And, third, in a global environment in which the hegemonic power of a single major power (the US) is being eroded and threatened by the rise of a new global hegemon (China), 'bringing production closer to home' provides for a greater measure of economic and social resilience in the historically dominant northern economies. Hence, specifically with regard to GVCs, we can anticipate a drawing-in of the global division of labour. This will involve a combination of reshoring (bringing back links in the chain previously located in China and other low-wage economies), nearshoring (insofar as offshoring continues, it will take place in neighbouring economies) and friend-shoring (insofar as offshoring continues, it will take place in economies within the geostrategic territory of the lead economies). A key difference between the ICT and previous paradigms is the type of infrastructure facilitating the paradigm's deployment. In previous paradigms, physical infrastructure (canals, railways, roads, shipping-containerisation, air transport) connected producers to consumers. In the knowledge-intensive ICT paradigm, the market-connecting infrastructure is the internet.

This changing spatial structure will provide high income countries with a combination of increasing economic and political resilience and at the same time restore corporate profitability and offer increasingly customised products to consumers. Given the reduction in transport involved in the drawing-in of GVCs and the opportunities

provided by ICTs for greener production and consumption, this transformation also offers the opportunity for a more sustainable economy, society and environment (Kaplinsky, 2021)

This does not of course bring globalisation to an end. But it does change its nature. Although we are already beginning to see signs of firms retreating from China (as, for example, in the case of Korea - Kim 2021), not all production will be brought back home or to neighbouring and friendly economies. Many products will continue to be manufactured in China and surrounding economies and be exported to Europe and North America.

To comprehend this changing character of the global production and trading economy - a shift from a centrifugal to a centripetal trajectory - we need to appreciate the determinants of economies of scale. Production involves a combination of fixed and variable costs, and direct and indirect costs. The higher the level of production, the more fixed costs can be spread across volume and the lower the unit costs of supply. This is one of reasons why in each paradigm, infrastructure was critical in tapping larger and increasingly distant input and output markets. Knowledge is essentially a fixed cost and the knowledge-intensity of production is increasing across the full range of human activities. Hence scale continues to be an important driver of competitiveness and growth in the ICT age. But the difference in the current phase is that the advance of ICTs provides the capability to manufacture cost-competitively on a lower-scale and distributed basis. So whilst the route to low cost production continues to be to spread aggregate production *across* large volumes, this no longer needs to be achieved primarily through economies of scale *within* production. The economies of scope triumphs over the economies of production scale. Hence at the same time that many of the world's largest firms are de-emphasising and in some cases reshoring export-oriented production from China and other low-cost production platforms, they continue to strive for scale at a global level, including increasing their investments in China and similar economies in order to achieve scale by producing for the domestic market. For example, both Apple and the German auto firms are reorienting their plants in China to primarily serve the domestic rather than global markets. Thus the changing character of globalisation is reflected in an extension of the global flows of investment, finance, knowledge and values but a drawing-in of the globalisation of production and trade.

Another important change in the changing character of globalisation will be the role played by regional value chains. There will continue to be gains to be reaped from specialisation and trade, albeit at a reduced level. Moreover, the drive for political and economic resilience will place a premium on proximity and shorter supply chains. Hence, insofar as production will continue to cross borders, this will result in an expansion in the relative importance of regional value chains. This trend is already underway - for example, the share of intra-regional trade for low- and middle-income economies expanded from 24 percent in 1999 to more than 40 percent in 2017.⁹ This transition will have important implications for the character of value chains in low and emerging countries (Kaplinsky and Kraemer-Mbula, 2021). As we saw in previous discussion, pressure from civil society in the high income countries has forced many

⁹ Calculated from <https://www.worldbank.org/en/publication/wdr2020>

of the lead global firms to address demands to monitor and change practices in their global supply chains in regard to working practices, wages, gender/youth employment and the environment. In many cases this has had a positive impact on the achievement of SDG goals, and has induced upgrading along the chain. But when demand shifts to consumers in low-income markets, the pressures for ESG in value chains diminishes. Although this may herald a deterioration in the positive social and environmental impact of value chains, it will at the same time promote greater inclusion. This is, as we saw above, because the standards intensity in GVCs resulting from ESG pressures tended to exclude illiterate and innumerate workers and informal sector firms.

These trends in the shallowing of Deep Globalisation will thus result in a series of changes to the character of global production and trade, to the distribution of income, to the character of political systems and on the environment. They offer the potential for a more sustainable economy, a more sustainable society and polity and a more sustainable environment. But at the same time, they can also lead to a less egalitarian and a less sustainable world. The complexity of this turning point is not unique to the transition from the Mass Production to the ICT TEP. All previous TEPs show a range of outcomes. For example, the Soviet Union and the USA both witnessed the deepening of Mass Production, yet with vastly different social and economic configurations and impacts on the environment. Hence imparting 'Directionality' to the rapidly deploying ICT TEP is critical if an improvement in sustainability is to be achieved (Kaplinsky 2021).

REFERENCES

- Baldwin, R. (2016), *The Great Convergence – Information Technology and the New Globalization*, Cambridge, Mass: Belknap Press.
- Fouquin, M. and J. Hugot (2016), [Trade globalisation in the last two centuries](https://voxeu.org/article/trade-globalisation-last-two-centuries), <https://voxeu.org/article/trade-globalisation-last-two-centuries>
- Freeman, C. (1995), "The 'National System of Innovation' in Historical Perspective", *Cambridge Journal of Economics*, Vol. 19, No. 1, pp. 5-24.
- Freeman, C. (1973). 'Malthus with a Computer', *Futures* 5, pp 5-13.
- Freeman C. and C. Perez (1988), "Structural Crises of Adjustment", in Dosi Giovanni et al (eds), *Technical Change and Economic Theory*, London, Frances Pinter.
- Freeman, C. and F. Louca (2001), *As Time Goes By: From the Industrial Revolution to the Information Revolution*, Oxford: Oxford University Press.
- Fukuyama, Francis (1989). "The End of History?". *The National Interest* (16): 3–18.
- Gereffi, G. (1994), "The Organization of Buyer-Driven Global Commodity Chains: How U. S. Retailers Shape Overseas Production Networks", in G. Gereffi and M. Korzeniewicz (eds.), *Commodity Chains and Global Capitalism*, London: Praeger.
- Gereffi, G. (1999), "International Trade and Industrial Upgrading in the Apparel Commodity Chain", *Journal of International Economics*, Vol. 48, No. 1, pp 37-70.
- Hamilton, G. and G. Gereffi (2009), "Global Commodity Chains, Market Makers, and the Rise of Demand-Responsive Economies" in Jennifer Bair (ed.), *Frontiers of Commodity Chain Research*, Stanford, CA: Stanford University Press, Pp. 136-161

- Hoffman K. and R. Kaplinsky (1988), *Driving Force: The Global Restructuring of Technology, Labor and Investment in the Automobile and Components Industries*, Boulder, Colorado: Westview Press.
- Humphrey, J. and H. Schmitz, (2001), "Governance in Global Value Chains", in G. Gereffi and R. Kaplinsky (eds.), *IDS Bulletin Special Issue on The Value of Value Chains*, Vol. 32, No. 3, pp. 19-29.
- Kabeer, N. (2000), *The power to choose: Bangladeshi women and labour market decisions in London and Dhaka*, London New York: Verso Books
- Kaplinsky R (1993), "Export Processing Zones in the Dominican Republic: Transforming Manufactures into Commodities", *World Development*, Vol. 21, No. 11, pp. 1851-1865.
- Kaplinsky, R. (2019), "Rent and inequality in global value chains" in S. Ponte, G. Gereffi and G. Raj-Reichert (eds.), *Handbook on Global Value Chains*, Cheltenham: Edward Elgar.
- Kaplinsky, R. (2021), *Sustainable Futures: An Agenda for Action*, Oxford: Polity Press.
- Kaplinsky, R., M. Morris and J. Readman (2002), "The Globalisation of Product Markets and Immiserising Growth: Lessons from the South African Furniture Industry", *World Development*, Vol. 30, No. 7, pp. 1159-1178
- Kaplinsky, R., A. Terheggen and J. P. Tijaja (2011), "China as a Final Market: The Gabon Timber and Thai Cassava Value Chains", *World Development*, Vol. 39, No. 7, pp. 1177-1190
- Kaplinsky, R. and M. Morris (2015), "Thinning and Thickening: Productive Sector Policies in the Era of Global Value Chains", *European Journal of Development Studies*, pp. 1-21, doi:10.1057/ejdr.2015.29.
- .D B Kline, 'Real U.S. Wages Are Essentially Back at 1974 Levels'
www.fool.com/investing/2018/08/14/real-us-wages-are-essentially-back-at-1974-levels.aspx
- Lee, K. and T. Park (2021), *Changing GVC in Post-Pandemic Asia: Korea, China and Southeast Asia*, Institute of Economic Research, Seoul, Seoul National University, <https://ier.snu.ac.kr/activity/working-papers?md=view&seqidx=67>
- Lundvall, B. A. (1992), *National Systems of Innovation*, London: Frances Pinter.
- Morris, M., R. Kaplinsky and D. Kaplan (2012), "One Thing Leads to Another" – Commodities, Linkages and Industrial Development, *Resources Policy*, Vol. 37, No. 4, pp. 408-416.
- Ohno, T. (1988), *Toyota Production System: Beyond Large-Scale Production*, Cambridge, Mass: Productivity Press.
- Perez, C. (2002), *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*, Cheltenham, Edward Elgar.
- Perez, C. (2010) "Technological Revolutions and Techno-economic paradigms", *Cambridge Journal of Economics*, Vol. 34, No.1, pp. 185-202
- Roubini, N. 'The Unavoidable Crash', Project Syndicate, 2nd December 2022 <https://www.project-syndicate.org/commentary/stagflationary-economic-financial-and-debt-crisis-by-nouriel-roubini-2022-12>).
- Shih, S. (1992). *Empowering technology—making your life easier*. Acer's Report, Acers, New Taipei.
- Tyson, L. and L. Mendonca, 'America's New Era of Industrial Policy, Project Syndicate', Jan 2nd 2023, <https://www.project-syndicate.org/commentary/biden-industrial-policy-renewables-semiconductors-good-jobs-by-laura-tyson-and-lenny-mendonca-2023-01?barrier=accesspaylog>

- UNCTAD (2013), *Global Value Chains and Development: Investment and International Trade in the Global Economy*, United Nations Conference for Trade and Development.
- Wade R. H. (1990), *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*, Princeton: Princeton University Press.
- Williamson, O. E. (1985), *The Economic Institutions of Capitalism: Firms, Markets and Relational Contracting*, New York: Praeger
- Xing, Y., and N. Detert (2010), 'How the iPhone Widens the United States Trade Deficit with the People's Republic of China', *ADB Working Paper 257*, Tokyo: Asian Development Bank Institute.