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RESEARCH PAPER

CHINA'S SERVICES TRANSFORMATION AND THE LOCAL SERVICES TRAP

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This paper examines the evolution of China's services sector between 2012 and 2022, analyzing the country's structural transformation based on a novel three-tier taxonomy: knowledge services (KS), enabling services (ES), and local services (LS). Using sixteen quantitative indicators from OECD databases, the study evaluates China's transition in comparison to the EU15 benchmark, highlighting three core challenges: manufacturing rebalancing, labor absorption, and global integration.

Three primary findings emerge. First, while manufacturing's share of GDP in China has stabilized at approximately 29% due to active industrial policy, manufacturing employment has decoupled from output as automation has reduced labor intensity. Second, the services sector has absorbed this released labor, but the composition is problematic: local services (LS) have absorbed the bulk of new jobs at low productivity levels, while high-productivity gains in enabling services (ES) have generated limited direct employment. Knowledge services (KS) remain dynamic but are currently too small and skill-constrained to serve as a primary growth engine. Third, China's external posture has shifted toward an 'inward turn' in direct services exports, countered by a strengthening indirect upstream channel via which producer services are increasingly embedded in other countries' exports.

The paper concludes that China faces a critical productivity/employment trade-off: a transition dominated by local services preserves social stability through job creation, but risks a structural ceiling on aggregate growth. Successful rebalancing will require resolving the structural conditions—specifically skill availability, geographic matching, and openness to foreign inputs—necessary to scale high-productivity knowledge services.

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I. INTRODUCTION: CHINA'S THREE STRUCTURAL TRANSFORMATION CHALLENGES

There is now near consensus, shared by external observers and Chinese policymakers, that China’s traditional outsized reliance on exports and trade surpluses could be reduced, and that the natural path is to rebalance production away from tradable manufacturing toward services and domestic demand. Current-account surpluses on the scale China has incurred over two decades are neither sustainable in the global trading system, nor compatible with the country’s stated objective of consumption-led, higher-quality growth. Successive five-year plans have endorsed precisely this direction.

Yet the prescription that ‘more services’ is the answer conceals more than it reveals. Services are not a homogeneous residual: they differ systematically across productivity, tradability, employment intensity, and integration into global value chains (GVCs). Which services expand, and through what absorption channel, will determine whether China’s transition generates broad-based prosperity or a structural ceiling on growth. To move beyond this simplification, this analysis employs a three-tier taxonomy that disaggregates services on these structural dimensions (Table 1).

Table 1
The KS–ES–LS Taxonomy of Services

Service Tier	Primary Characteristics	Role in Employment	Tradability and Productivity
Knowledge Services (KS)	ICT, professional, scientific, and business services.	High skill-intensity; currently small employment base; requires specific structural prerequisites.	Highly tradable; high productivity potential; globally scalable; current consumer-platform bias in China.
Enabling Services (ES)	Transport, logistics, finance, and insurance.	Indirect employment role; facilitates downstream manufacturing competitiveness.	High productivity through scale and automation; state-dominated; productivity gains accrue to capital.
Local Services (LS)	Wholesale/retail, hospitality, real estate, education, health, and personal services.	Primary labor absorber for workers exiting agriculture and manufacturing.	Primarily non-tradable; low productivity ceiling; labor-intensive with high labor-income share.

Three primary findings emerge. First, while manufacturing’s share of GDP has stabilized at approximately 29% due to China’s active industrial policy, manufacturing employment has decoupled from output as automation reduces labor intensity. Second, the services sector has absorbed this released labor, but the composition is problematic: local services (LS) have absorbed the bulk of new jobs at low productivity levels, while high-productivity gains

in enabling services (ES) have generated limited direct employment. Knowledge services (KS) remain dynamic but are currently too small and skill-constrained to serve as a primary growth engine. Third, China's external posture has shifted toward an 'inward turn' in direct services exports, countered by a strengthening indirect upstream channel, through which producer services are increasingly embedded in other countries' exports.

The analysis draws on sixteen quantitative indicators derived from the OECD Trade in Value Added (TiVA) and Trade in Employment (TiM) databases for 2012–2022. The EU15¹ is used as the primary mature-economy benchmark, except where a country-specific input-output table is required to construct the indicators, in which case United States data are employed. Annex 1 provides indicator definitions, and Annex 2 provides detailed data tables.

II. LITERATURE REVIEW: THE TRANSFORMATION OF CHINA'S SERVICES SECTOR

This section places the paper's findings in the context of academic and professional studies published over the last ten years. The literature broadly validates the core findings of this paper about the stabilization of manufacturing output through industrial policy, the labor-displacing impact of automation, and China's 'inward turn' in global trade. At the same time, it brings up genuine debates—over the extent of the 'local services trap', and whether services productivity is higher than traditionally estimated—that the analysis below engages directly.

2.1. Manufacturing Rebalancing and the Impact of Automation

The finding that manufacturing output and employment have decoupled is strongly supported by recent data. China's industrial robot stock grew by nearly 500% between 2013 and 2019 (Luo et al, 2026). By the mid-2020s China was installing more industrial robots than the rest of the world combined (Grant-Chapman et al, 2026). This is a strategic, state-orchestrated response to rising wages and an aging population (Mani, 2025). The literature likewise confirms the 'structurally anomalous' result that China has stabilized its manufacturing value-added share through aggressive industrial policy (Hirson and Song, 2026). This 'policy resistance' to deindustrialization is exemplified by the Made in China 2025 initiative and the Dual Circulation strategy, which aim at high self-sufficiency in core technologies (CRS, 2026; Lo, 2020). On labor displacement, while some firm-level studies suggest robot-adopting firms may raise employment through scale (Gao et al, 2024), regional macro evidence supports the conclusion reached here: a one standard-deviation increase in robot exposure has been shown to reduce individual employment probability by roughly five percentage points (Giuntella et al, 2025).

2.2. Labor Absorption and the Services Trap

The literature supports the taxonomy used here, and in particular the problematic nature of labor absorption in local services. Much of the growth in services employment is 'de-organized', with labor absorbed by digital platforms rather than formal firms (Wang et al, 2026), creating a large pool of flexible workers who have low wages and work long hours, directly consistent with the 'local-services trap' identified in this paper (Datta et al, 2023;

1. OECD TiVA's EU15 is the historically-defined group of 15 EU member states prior to the 2004 enlargement — which is today's EU14 plus the UK. The UK is included throughout the entire time series, including post-Brexit years, precisely to maintain analytical consistency. The OECD deliberately retains this composition rather than switching to a current-membership definition.

Hao, 2023). On productivity, the literature is not unanimous: research from the NBER argues that total-factor-productivity growth has been faster in services than in manufacturing since 2005, casting services as a primary growth engine, rather than a residual category (Chen et al, 2022), whereas others warn that a shift toward a ‘high-tech, low-productivity trap’ could impose a growth ceiling (Hammer and Yusuf, 2020). The analysis below sides with the latter view for marginal labor absorption, while acknowledging the heterogeneity the NBER work documents. Finally, reports echo the finding that knowledge services are dynamic but constrained by a persistent shortage of skilled professionals (China Daily, 2026; Global Times, 2026).

2.3. External Posture and Global Integration

Research also supports the identification of an ‘inward turn’, alongside a more hidden form of upstream integration. China’s foreign-trade dependency ratio fell sharply over the period; this can be interpreted as a proactive hedge against geopolitical decoupling and a move toward high-standard self-reliance (Yu et al, 2022; Lo, 2020). At the same time, the finding about a strengthening indirect upstream channel is supported by evidence that China is capturing more value-added by embedding its producer services (IT, logistics) into other countries’ exports while reducing foreign value-added in its own (Tran, 2022). This allows China to maintain deep integration with GVCs through producer-facing channels, even as direct, consumer-facing services exports weaken.

III. THE MANUFACTURING TRAJECTORY: REBALANCING AND RESISTANCE

China is the world’s largest manufacturer by every measure: gross output, value added, export volumes, and employment. Table 2 places its trajectory in a cross-country perspective, and the divergence from every comparator is structurally distinctive.

Table 2

Manufacturing Share of GDP: China and Comparators (%), Selected Years

Country	2012	2014	2016	2018	2020	2022
China	32.2	30.9	28.6	28.5	28.8	28.9
Vietnam	31.8	35.0	38.2	38.6	38.3	39.7
Thailand	27.3	26.8	26.7	26.5	25.8	26.9
Mexico	18.7	18.5	20.5	20.8	20.8	21.9
Tunisia	18.9	18.4	17.8	18.4	17.7	18.1
India	17.9	17.3	17.8	17.4	16.3	15.7
Morocco	17.3	17.4	16.9	17.2	17.3	18.0
Peru	16.9	15.7	14.9	14.7	13.7	14.0
Egypt	15.5	15.5	15.5	15.0	15.4	15.4
EU15	15.3	15.3	15.9	15.9	15.3	15.5

Source: Author’s calculations from OECD (2025), Trade in Value Added (TiVA) database.

China’s configuration is structurally anomalous among comparators. Its manufacturing share is nearly double the EU15 post-industrial benchmark, and has not followed the textbook

deindustrialization path. Unlike Vietnam's FDI-led surge—rapid expansion in a small open economy of a kind that would be difficult to replicate at China's scale—and unlike India's premature drift downward from approximately 18% to 16% (consistent with Rodrik's thesis (Rodrik, 2016) of deindustrialization before reaching the productivity frontier), China has stabilized its share through active policy resistance. This constitutes a third configuration: large, stable, and state-supported.

3.1. The Empirical pattern: Partial Decline Followed by Stabilization

OECD TiVA data record that China's manufacturing share of GDP fell from 32.2% in 2012 to 28.6% in 2016, a contraction of approximately 3.6 percentage points over four years, broadly consistent with textbook deindustrialization. It then stabilized in a narrow band of 28.5% to 28.9% through 2022 (Annex 2, Table 1). The pre-2016 pace, equivalent to roughly one percentage point of GDP per year, was not sustained. The World Bank national-accounts series (NV.IND.MANF.ZS) records systematically lower levels than OECD TiVA, reflecting differences in classification scope and treatment of borderline activities under ISIC Rev. 4. Nevertheless, the World Bank data confirm the directional story: a clear decline through the mid-2010s followed by a sharp slowing. World Bank figures show approximately 26.6% in 2021, 25.5% in 2023, and 24.9% in 2024, suggesting continued slow drift rather than a true plateau. Given the limitations in the available data on China, the past decade is best described as a marked moderation in the previous decline—with China's manufacturing share stabilizing near 29%—rather than a permanent settlement.

3.2. Active Policy Resistance to Deindustrialization

The slowing of the decline coincides with three policy developments. Made in China 2025, signed in May 2015 and operationalized from 2016, explicitly targeted the upgrading and protection of the manufacturing base across ten priority sectors, including semiconductors, advanced robotics, aerospace, biomedicine, and new-energy vehicles. This shifted China's ambition from 'workshop of the world' to high-value-added technology manufacturer. The timing of the policy launch coincides with the inflection point in the data.

The scale of resources mobilized has been very large. DiPippo et al (2022) estimated China's industrial-policy spending reached approximately 1.7% of GDP by 2019, more than twice the level of South Korea and over four times that of the United States. Broader estimates including subsidized credit, tax benefits, and land for favored sectors put the total fiscal cost at roughly 4% of GDP per year (Garcia-Macia et al, 2025), with the bulk directed to manufacturing. The International Monetary Fund (IMF, 2025) documented the misallocation costs that accompany interventions of this scale.

The political intent was made explicit in the 14th Five-Year Plan (2021–2025), which adopted as a stated objective the "basic stability of the manufacturing share" of GDP, replacing the emphasis in earlier plans on raising the services share, and signaling deliberate resistance to the textbook deindustrialization path. Independent observers, including Batson's work on Chinese industrial structure (2023, 2025), describe the post-2022 picture as a partial loss of this battle, reinforcing the reading that the stabilization observed through 2022 was time-bounded and fragile, rather than durable.

3.3. The Output-Employment Decoupling

A sharply different picture emerges when the labor aspect of the manufacturing challenge is examined. From 2012 to 2022, there was decoupling of manufacturing output from

manufacturing employment in China, similar to what has marked the structural transformation of every advanced economy. Manufacturing output continued to expand in absolute terms, and its share of GDP held broadly stable on the OECD TiVA basis, but manufacturing employment stagnated and in several years contracted (Annex 2, Table 2). The mechanism seems to be the accelerating adoption of automation, robotics, and artificial intelligence in Chinese factories, which reduced the labor-absorption coefficient of manufacturing, even as the sector continued to grow in output.

In the historical experience of high-income economies, manufacturing typically lost ground in both output and employment as services expanded. In China, the output side has been actively stabilized by policy, while the employment side has already completed its rebalancing. That decoupling is not an equilibrium: it means the labor released by manufacturing is flowing into services, regardless of what happens to the output share, and the structural transformation is proceeding in the employment dimension, even as industrial policy resists it in the output dimension.

3.4. The Destination and Productivity Conditions of Released Labor

The labor released by manufacturing has been absorbed almost entirely by services. The services share of GDP rose from approximately 44% in 2012 to 50% in 2022, and the services share of total employment rose from approximately 36% to 48%, crossing the threshold conventionally associated with a service-dominated employment structure (Annex 2, Tables 1 and 2).

The composition of this absorption was highly asymmetric. Local services accounted for the largest share of new employment by a wide margin. Knowledge services expanded substantially in relative terms—headcount in computer programming nearly tripled, and administrative and support services tripled—but from very small bases. Enabling services contributed only modestly to net employment growth. The single largest absorption channel was wholesale and retail trade, which accounted for the largest employment-share gain of any services subsector in the dataset.

This asymmetry was not accidental. Workers displaced from labor-intensive manufacturing—apparel, footwear, furniture, basic electronics assembly—cannot in general flow into knowledge services for three structural reasons that recur throughout the analysis below. First, the skill profile required for knowledge services—formal education, technical training, digital fluency—does not match the profile of displaced manufacturing workers. Second, the geographic clustering of knowledge services in China’s coastal first-tier cities does not match the interior and coastal-belt distribution of displaced manufacturing labor. Third, the capital intensity of knowledge services limits the rate at which new employment can be created. The displaced labor therefore flows into local services, where entry barriers are low and domestic-demand expansion absorbs new workers at the margin.

The productivity conditions in which this absorption occurred define the core problem. Value added per worker (Annex 2, Table 4) reveals a sharp gradient across the subsectors that absorbed this labor. The scale-intensive enabling services in which employment growth was modest registered the largest productivity gains of any subsector in the entire dataset. By contrast, the local services in which employment growth was largest, registered only modest productivity gains. The subsectors with the greatest productivity gains absorbed the smallest shares of released labor; the subsectors that absorbed the largest shares delivered the smallest productivity gains. This inverse relationship between employment absorption and productivity performance is the empirical signature of the second challenge, and sets the terms for the analysis in the following section.

IV. THE SERVICES FRONTIER: ABSORPTION VS. PRODUCTIVITY

The services sector has absorbed the labor released from manufacturing, but the composition of that absorption has structural consequences. The subsectors creating the most jobs are those with the lowest productivity ceilings—a rivalry between employment absorption and productivity-led growth that is the central tension in China's structural transformation.

4.1. Knowledge Services: Dynamic but Small; Productive but Skill-constrained

Knowledge services are the sub-tier with the greatest potential for productivity-led growth and high-quality job creation. Over the decade, this tier expanded rapidly in both share and headcount, but from a small base. Its share of GDP rose by roughly a third and its share of employment nearly doubled (Annex 2, Tables 1 and 3). Within KS, the most dynamic subsectors were computer programming and information services, and administrative and support services. Telecommunications and traditional publishing moved more slowly.

The productivity profile of this expansion is the central diagnostic. Value added per worker in KS subsectors rose substantially in relative terms, but remains far below advanced-economy levels (Table 4). The China-EU15 productivity gap in computer programming is several-fold; in professional services, comparable. The expansion of KS in China has been primarily extensive (more workers at moderate productivity) rather than intensive. This is the reverse of the EU15 pattern, in which KS combine high employment shares with very high productivity.

The multiplier and factor-income indicators reinforce this diagnosis. Value-added multipliers in KS subsectors (Table 14) rose modestly over the decade. The labor-income share (Table 15) is moderate in most KS subsectors, but very low in telecommunications, where state-owned-operator dominance means the bulk of value added is captured as state-retained earnings, rather than labor compensation. As noted by Lin et al (2010), China has had a large surplus in enterprise savings. Headcount expansion in computer programming and administrative support has therefore created jobs, but income gains per unit of activity are constrained by both the productivity ceiling and, in concentrated subsectors, by the distribution of value added between labor and other claimants.

The linkage profile adds a further qualification. Computer programming and information services—the most dynamic KS subsector—became a progressively weaker supplier of inputs to the rest of the economy over the decade, with its forward-linkage index falling well below the economy-wide average, even as it expanded rapidly in headcount (Table 10). This is the empirical signature of a digital-services cluster oriented toward consumer platforms—e-commerce, ride-hailing, food delivery, social media, fintech—rather than toward producer services that feed productivity into other sectors. The contrast with the U.S. is striking: U.S. computer services combine high productivity with rising upstream supply to other industries, exhibiting forward-linkage indices of 1.23 for computer programming, 1.29 for professional services, and 1.37 for administrative services. The corresponding Chinese values are substantially lower: 0.55 for computer programming, with the others only marginally above unity. China's KS expansion has produced the consumer-platform configuration; the producer-services configuration remains underdeveloped.

KS in China are therefore dynamic but currently constrained: rapid growth from a small base, productivity rising but remaining at a fraction of advanced-economy levels, employment concentrated in moderate-skill segments rather than high-skill ones, and an upstream-supply

role that has weakened rather than strengthened. They are not, in their current configuration, the primary engine of productivity-led labor absorption.

4.2. Enabling Services: Large Productivity Gains, Indirect Employment Effects

Enabling services account for a substantially larger share of GDP than KS and reached structural parity with the EU15 ES share over the decade (Table 1). The tier is heavily weighted toward finance and transport, and is built around scale-intensive, state-owned-enterprise-dominated operations.

The most analytically distinctive feature of the ES tier is the productivity surge in scale-intensive subsectors in which technology is dominated by large fixed-cost infrastructure (port terminals, mobile networks, aircraft fleets, rail networks), and where value added per worker rises sharply when capacity is automated or consolidated. Water transport recorded the largest productivity gain of any subsector in the China dataset: value added per worker rose from approximately \$35,000 in 2012 to approximately \$181,000 in 2022, a five-fold increase (Table 4). Telecommunications followed with a roughly three-fold rise (from approximately \$33,000 to approximately \$106,000), and air transport with a near doubling.

Cross-country comparison with the EU15 reveals two distinct mechanisms. In water transport, the EU15 also recorded large productivity gains (from approximately \$189,000 to approximately \$429,000 per worker), indicating that container-shipping consolidation, mega-vessel deployment, and port automation are global structural forces operating on both economies. China rode this wave to narrow the productivity gap with the EU15, with its productivity rising from roughly 18% of the EU15 level in 2012 to about 42% in 2022, though it still remains less than half the EU15 level. In telecommunications and land transport, by contrast, the surge was uniquely Chinese. EU15 telecommunications productivity actually declined modestly over the decade (from approximately \$264,000 to approximately \$218,000), reflecting price compression and commoditization in mature markets. China closed from roughly 13% to roughly 49% of the EU15 level. This came entirely from the Chinese side rising against a flat or declining benchmark. These two mechanisms have different durability implications: the water-transport convergence will continue as long as the global structural force operates, while the telecommunications and land-transport catch-up is likely to slow as China approaches the EU15 frontier.

The employment contribution of ES is small in direct terms; the tier did not absorb a substantial share of net new employment over the decade (Table 3). The relevant contribution is indirect, captured by the employment multiplier (Table 11) and the forward-linkage index (Table 10). The strongest forward-linkage subsectors in the entire China services tier are concentrated in ES, including warehousing, water transport, land transport, and postal and courier services; several registered substantial increases over the decade. The growth of ES therefore generates demand for employment in the sectors it supplies (manufacturing, wholesale and retail, construction), even if it adds few workers to its own headcount.

The factor-income distribution in enabling services qualifies the productivity story significantly. The labor-income share in water transport, telecommunications, and finance is comparatively low (Table 15), reflecting the dominance of state-owned enterprises. The very large productivity gains in these subsectors therefore accrue disproportionately to capital and the state rather than to workers. ES are, in short, the productivity backbone of the Chinese services economy, delivering the largest productivity gains of the decade and contributing substantially to downstream sectors through their forward linkages. But ES are not the economy's employment backbone, and not a generator of widely distributed labor income.

4.3. Local Services: The Actual Absorber, but at Low Productivity

Local services are the largest of the three categories and accounted for the bulk of net new employment over the decade (Annex 2, Tables 2 and 3). Within LS, wholesale and retail trade is the largest subsector by both GDP and employment, followed by real estate, public administration, education, and health. Wholesale and retail trade recorded the single largest employment-share gain of any services subsector in the entire China dataset.

The productivity profile of LS is the structural mirror image of ES. Productivity gains were positive but modest across most LS subsectors (Table 4). The largest gains came in public-sector subsectors—public administration, education, and health—reflecting professionalization and capital-intensification of public services. Wholesale and retail trade, the largest absorber of new labor, ended the decade at a productivity level well below enabling-services subsectors that lost employment. The pattern is consistent with Baumol-type productivity dynamics: limited scope for capital substitution for labor, limited tradability, and limited exposure to international competitive pressure.

The EU15 comparison sharpens the assessment. In wholesale and retail trade—the largest single absorber of new Chinese labor—value added per worker stood at approximately \$14,600 in China in 2022, against approximately \$68,200 in the EU15, putting China at roughly 21% of the EU15 level. Public administration, education, and health stood at approximately 45%, 41%, and 46% of EU15 levels respectively in 2022; accommodation and food at approximately 24% (Table 4). For context, China's GDP per capita in 2022 was approximately \$12,200 against an EU15 average of approximately \$40,400, meaning the productivity gap in LS is substantially wider than the aggregate income gap alone would suggest. China's LS are doing what local services do everywhere—absorbing the bulk of employment at modest productivity—but at productivity levels typically one-fifth to one-half of corresponding EU15 levels. The absorption is solving the social-stability problem of employment at the cost of accepting a structural ceiling on productivity-led growth.

The factor-income distribution in LS is, however, the most labor-favorable of the three tiers. The labor-income share in public-sector subsectors—public administration, education, health—is the highest in the entire services tier (Table 15), meaning that even at modest productivity levels, activity in these subsectors translates relatively fully into worker income. Private LS subsectors display intermediate labor-income shares. The linkage profile, by contrast, limits the indirect contribution of LS expansion: backward-linkage indices are predominantly below the economy-wide average (Table 9), and forward-linkage indices are similarly low or modest, with the partial exception of wholesale and retail trade. LS expansion therefore produces limited multiplier effects, beyond the direct labor-income channel.

4.4. The Composition Trade-off

The three sub-tier analyses give the structural answer to the second challenge. KS have grown rapidly but from too small a base, and at too modest a productivity level, to serve as the productivity engine for the services economy as a whole. ES have delivered the largest productivity gains of the decade, but employ too few people directly, and their gains accrue disproportionately to capital and the state. LS have absorbed the bulk of new labor, but at low productivity and with limited multiplier effects.

The composition trade-off is therefore central. A composition tilted further toward LS preserves labor absorption but constrains productivity-led growth. A composition that successfully scales KS would resolve the trade-off, but requires structural conditions that the decade did not produce: skill availability, geographic matching of displaced workers with

KS clusters, and access to the foreign inputs and markets that have historically supported knowledge-economy maturation. The policy challenge is not identifying the high-productivity subsectors—the indicator analysis does that clearly—but creating the conditions under which labor absorption can flow toward them. LS can absorb labor without those conditions. KS cannot. That asymmetry is the core of the trade-off, and it will not resolve itself through market forces alone.

V. GLOBAL INTEGRATION: THE TRANSFORMATION OF EXTERNAL POSTURE

The third challenge concerns what the emerging production structure implies for China's position in GVCs, its trade patterns, and its external economic and geopolitical posture. The Chinese decade has produced a distinctive pattern: the visible foreign-engagement channels have weakened, while a less-visible upstream channel has strengthened. The net implication is a transformation of the form of China's integration with the world economy, not its abandonment.

5.1. Direct Services-Export Integration: The Inward Turn

The direct foreign-final-demand channel—the share of a subsector's value added reaching foreign consumers through exports—is modest in China's KS, and either flat or declining over the decade (Table 6). Information and communication, computer programming, professional services, and administrative support each registered low single-digit to low-teens values in 2012, and either stayed at those levels or had declined modestly by 2022. The EU15 comparison shows the inverse: in advanced economies, KS sub-sectors registered rising direct foreign-final-demand shares over the same decade, the output-side signature of mature knowledge clusters finding expanding foreign markets. The structural divergence between China and the EU15 on this dimension widened over the decade, rather than narrowed.

The same inward turn appears on the input side. The share of foreign value added in China's KS exports declined across all KS subsectors (Table 12), while in the EU15 the corresponding share rose. The EU15 trajectory of rising foreign content reflected deepening backward integration: as knowledge clusters mature, they draw on globally sourced specialized inputs, including software platforms, advanced semiconductors, and specialized professional-services frameworks, and foreign content thus rises. The Chinese trajectory of falling foreign content cannot be read as the equivalent of mature self-sufficiency, because KS productivity in China remains far below EU15 levels and is rising slowly. A self-sufficient mature knowledge cluster would display productivity gains commensurate with its declining foreign content; this is not the Chinese pattern. The data are more consistent with foreign inputs being progressively withdrawn, and domestically sourced substitutes of lower productive quality being adopted in their place.

The employment indicators (Tables 7 and 8) reinforce the inward turn. The share of KS employment dependent on foreign demand declined modestly over the decade, indicating that workers in China's knowledge subsectors are increasingly serving domestic demand, and decreasingly exposed to foreign-demand fluctuations.

5.2. The Indirect Upstream Channel: A Counter-pattern

The most analytically distinctive feature of China's services trajectory is the indirect upstream channel. While direct services-export integration has weakened, the share of Chinese services value added embodied in other countries' exports has risen sharply across all KS subsectors (Table 13). The increase is most striking in computer programming, where the indicator nearly quintupled over the decade. It is also substantial in professional services and administrative support. China's KS are increasingly embedded as upstream suppliers of producer services to foreign manufacturing exporters, even as the direct services-export channel is constrained. China's services integration with the world economy has not collapsed; it has shifted form, from direct exports toward indirect upstream participation.

This counter-pattern requires careful interpretation. Compared to direct services-export participation, indirect upstream participation typically generates lower margins, lower foreign-exchange capture, and lower productivity spillover. A unit of services value embedded in another country's export is not equivalent in income or productivity terms to a unit sold directly to a foreign final consumer. The indirect channel is best understood as a constrained second-best—Chinese KS capturing upstream value where direct value capture is denied—not as a full substitute for the suppressed direct channel.

Within ES, water transport is the structural exception: combining very high direct foreign-final-demand integration (nearly all of its value added accumulates to foreign final consumers through the manufacturing exports it transports) with a rising indirect upstream channel and the largest productivity gains of any subsector in the dataset (Tables 4, 6, 13). This is the clearest example in the China services tier of an ES subsector reaching scale-and-productivity convergence with advanced-economy benchmarks, while remaining deeply embedded in the foreign-final-demand-bound supply chain. Its specificity—integration with manufacturing exports rather than independent value capture, and low labor-income share consistent with state-owned-enterprise dominance—limits the generality of this model for the rest of the services tier.

5.3. Implications for External Posture

The external posture implied by this configuration differs from the manufacturing-led model that preceded it in three ways. First, the visible foreign engagement of services—direct services exports, foreign-input content of exports, employment exposure to foreign demand—has weakened. By the metrics most commonly used to assess services-trade engagement, China was less integrated with the world services economy in 2022 than in 2012. Second, the indirect upstream channel has strengthened: China remains deeply integrated with the world economy through producer services embedded in others' exports; by this less commonly measured metric, its services-tier integration with GVCs has deepened. Third, the asymmetry between the two patterns is itself the empirical signature of the operating environment: direct services exports constrained by export controls, security reviews, and de-risking, while upstream participation in foreign-manufacturing supply chains continues.

The geopolitical implication is a transformation rather than a retrenchment. China's external engagement is shifting from a direct, visible, consumer-facing form of services trade, toward an indirect, upstream, producer-facing one. The former is more easily measured and more easily targeted by trade-policy instruments. The latter is harder to measure, harder to target, and operates through supply-chain embeddedness rather than direct trade. The decade to the end of 2022 shifted China's services integration toward the second mode, and away from the first, toward a third configuration, less visible and more upstream, the strategic implications of which are still emerging and will shape both the trade-policy environment and the geopolitical posture of the decade ahead.

VI. STRATEGIC SYNTHESIS: THE PRODUCTIVITY CEILING AND THE PATH FORWARD

Three structural propositions follow from the evidence, each with direct implications for China's policy agenda.

First, the two dimensions of the manufacturing rebalancing have decoupled, and that decoupling is not an equilibrium. The employment side has completed the rebalancing: workers have left manufacturing at scale, and have been absorbed into services regardless of what industrial policy achieves on the output side. The output side has been stabilized by fiscal weight, but the most recent data (Batson, 2025; World Bank, 2026) suggest the stabilization is fragile and already eroding. The critical consequence is not the manufacturing trajectory itself, but what it means for productivity: the labor absorbed by services is flowing predominantly into local services at productivity levels substantially below what advanced-economy structural transformation would predict. An economy in which marginal labor absorption is concentrated in low-productivity local services faces a structural ceiling on aggregate growth.

Three levers determine whether labor absorption drags on aggregate productivity growth. The first is maintaining manufacturing's output share, so that the high-productivity tradable base is not eroded; the second is letting KS expand and converting their headcount growth into genuine productivity leadership; and the third is strengthening the export integration of services by reversing the inward turn. The manufacturing lever alone cannot substitute for the other two—above all for shifting the composition of services absorption toward higher-productivity tiers.

Second, the composition of the services tier matters more than its size; resolving the structural prerequisites for KS scaling is the central policy challenge. China has reached the aggregate size of an advanced services economy, but it does not have its structure. The composition remains biased toward enabling and local services, and away from KS, relative to the EU15 benchmark; that bias did not narrow over the decade. The structural challenge is not identifying the high-productivity subsectors—the indicator analysis does that clearly—but creating the conditions in which labor absorption flows toward them. Three structural prerequisites are necessary: skill formation matching KS requirements; geographic clustering that reduces the distance between interior labor pools and coastal KS centers; and openness to the foreign inputs and markets that have historically supported knowledge-economy maturation. LS can absorb labor without any of these conditions. KS require all three. That asymmetry is the core of the productivity ceiling, and it will not resolve itself.

Comparison with India offers a forward-looking diagnostic that sharpens this proposition. China and India entered the observation window from opposite structural positions—China at approximately 32% of GDP in manufacturing, India at approximately 50% in services—and each tested a different configuration. India's decade saw its computer-programming sector deepen considerably: value added per worker approximately tripled, and upstream embedding in foreign exports rose fivefold. But the sector's enclave characteristics intensified alongside its scale. Its labor-income share fell from approximately 26% to 11% of value added, its domestic forward linkage remained below average, and manufacturing failed to provide the labor-absorption complement that services-export success required (Dinh 2026b).

China's KS subsectors, meanwhile, are now expanding rapidly in headcount and deepening their GVC embedding through the indirect upstream channel. If that expansion occurs without commensurate strengthening of backward and forward domestic linkages—and

without retaining a rising share of value added as labor income—China risks replicating India's enclave pattern at larger scale: productivity leadership concentrated in internationally connected clusters that generate growth without generating broadly distributed income. The indicator framework deployed in this paper—linkage indices, labor-income shares, employment multipliers—provides the monitoring architecture to identify this trajectory before it consolidates. The shared structural lesson is that the composition of services absorption, not its aggregate size, is the variable on which development trajectories diverge, and that composition does not correct itself through market forces alone. Both economies require a big-push coordination logic. China must redeploy its demonstrated state capacity from stabilizing manufacturing output toward managing the structural conditions that scale knowledge services. India must deepen the domestic integration of its IT enclave, and widen the KS portfolio.

Third, the external posture of a services-led China is a qualitatively different proposition from the external posture of a manufacturing-led China, and the transition has already begun. The visible foreign engagement of services has weakened over the decade while the indirect upstream channel has strengthened. China's services-tier integration with the world economy is not collapsing but transforming. The implications for trade policy, for geopolitical posture, and for partner economies that rely on Chinese services inputs are still emerging. Nevertheless, it is clear they are consequential and different in kind from those of the 2012-2022 manufacturing-led decade.

A further consideration cuts across all three propositions: the policy architecture through which China is managing the opening of its services economy. The 15th Five-Year Plan (2026–2030) signals a deliberately 'controlled' liberalization of selected producer-facing services, rather than wholesale opening (CRS, 2026). The logic is twofold. Empirically, services-trade liberalization in China has been associated with productivity gains through competition and technology-spillover effects (Fu et al, 2023), reinforcing the productivity-ceiling argument advanced here: selective opening is one of the few instruments able to lift KS productivity toward the frontier. Strategically, controlled opening also functions as a geopolitical 'body-lock': by admitting foreign firms into high-value domestic segments, China cultivates commercial constituencies abroad with a stake in continued engagement, partly offsetting the decoupling pressures that the inward turn would otherwise intensify.

The controlled-liberalization lever therefore complements, rather than contradicts, the inward turn documented above: openness is being limited to the subsectors in which productivity spillovers are largest and geopolitical leverage is greatest.

The decade ahead will determine which structural transitions China successfully completes. At the center of all of them is a single strategic trade-off: a services configuration weighted toward LS preserves labor absorption and social stability, but constrains productivity-led growth and limits external integration; a configuration weighted toward KS would resolve the productivity deficit, but requires the structural conditions—skills, clusters, openness—that the decade to 2022 did not produce at sufficient scale. China has expanded both tiers simultaneously. The question is whether the proportions can be shifted before the window closes. Shifting those proportions requires moving all three levers together, rather than relying on any one; the empirical record of 2012–2022 does not fix the trajectory of the decade ahead, but it does establish the boundary conditions within which that trajectory must be set, and shows the distance still to be traveled.

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ANNEX 1: INDICATOR DEFINITIONS

This annex summarizes the sixteen indicators used in the analysis, organized into four assessment groups.

GROUP 1: COMPOSITION OF GDP AND EMPLOYMENT

Three indicators describe the size and composition of the services tier. Services shares of GDP (Table 1) reports the share of each services subsector in total GDP. Employment by broad sectors (Table 2) reports total employment in agriculture, industry, and services. Employment shares by services subsector (Table 3) reports the share of each services subsector in total employment. Together these three indicators map the structural composition of the economy.

GROUP 2: PRODUCTIVITY AND FACTOR-INCOME DISTRIBUTION

Four indicators describe productivity, multipliers, and factor-income distribution. Value added per worker (Table 4) measures productivity in thousands of U.S. dollars per worker. The value-added multiplier (Table 14) captures additional value added generated economy-wide per unit of final demand directed to the sector. The labor-income share of value added (Table 15) reports the fraction of value added accruing to labor income. The labor-income multiplier (Table 16) reports labor income generated economy-wide per unit of final demand. Tables 14, 15, and 16 are derived from the country-level Leontief inverse and therefore require a single-economy input-output matrix; for the EU15 reference values used as comparators, U.S. data substitute for the unavailable EU15 single-economy input-output matrix, in the same way as for Group 3 indicators.

GROUP 3: DOMESTIC LINKAGES AND EMPLOYMENT MULTIPLIERS

Three indicators describe the input-output integration of each su-sector with the rest of the domestic economy. The Hirschman-Rasmussen backward-linkage index (Table 9) measures the strength of a subsector as a puller of upstream demand. The forward-linkage index (Table 10) measures the strength of the subsector as a supplier of inputs to other subsectors. Both indices are normalized so that the economy-wide average is unity. The employment multiplier (Table 11) reports total employment generated economy-wide per unit of final demand directed at the sector. For the EU15 reference values used as comparators, U.S. data substitute for the unavailable EU15 single-economy input-output matrix; the resulting EU15 indicators should be interpreted with that substitution in mind.

GROUP 4: GVC PARTICIPATION

Six indicators describe the depth and direction of integration into GVCs. The share of domestic value added in gross exports (EXGR_DVA, Table 5) and the share of foreign value added in gross exports (EXGR_FVA, Table 12) decompose exports into domestic and foreign content. The share of domestic value added that reaches foreign final demand (FFD_DVA, Table 6), and the share embodied in other countries' gross exports (FEXGR_DVA, Table 13), decompose forward integration into direct and indirect channels. The shares of subsectoral employment embodied in gross exports (EXGR_DEM, Table 7), and in foreign final demand (FFD_DEM, Table 8), translate the value-added flows into the labor-market dimension.

ANNEX 2

Table 1

China: Services Shares (%) of GDP, 2012-2022

ANALYSIS BY GROUPS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services	6.3	6.5	6.8	7.3	7.6	8.0	8.5	8.4	8.3	8.6	8.6
Information and communication (J)	2.2	2.3	2.5	2.5	2.7	2.8	3.1	2.9	2.9	2.9	2.9
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3
Telecommunications (J61)	1.3	1.1	1.2	1.2	1.3	1.4	1.5	1.4	1.4	1.4	1.4
Computer programming, consultancy, and information service activities (J62-63)	0.7	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.2
Professional, scientific and technical activities (M)	2.0	2.0	2.0	2.2	2.1	2.2	2.3	2.8	2.9	2.9	2.9
Administrative and support service activities (N)	2.1	2.2	2.3	2.6	2.8	2.9	3.1	2.7	2.4	2.8	2.7
Enabling Services	11.1	11.4	11.7	12.6	12.5	12.3	12.1	11.4	11.2	11.3	11.2
Transportation and storage (H)	4.8	4.7	4.7	4.7	4.7	4.7	4.7	5.3	4.9	5.0	5.0
Land transport and transport via pipelines (H49)	3.3	3.1	3.2	3.1	3.3	3.2	3.1	3.5	3.1	3.2	3.2
Water transport (H50)	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Air transport (H51)	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
Warehousing and support activities for transportation (H52)	0.6	0.5	0.5	0.6	0.5	0.5	0.6	0.6	0.7	0.6	0.6
Postal and courier activities (H53)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Financial and insurance activities (K)	6.3	6.7	7.0	7.9	7.8	7.5	7.4	6.1	6.2	6.3	6.3
Local Services	26.7	27.5	28.1	29.1	30.6	30.7	31.0	30.1	29.9	30.2	30.3
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	9.0	9.3	9.6	9.6	9.7	9.6	9.5	9.7	9.8	9.9	9.9

Accommodation and food service activities (I)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Real estate activities (L)	5.5	5.7	5.7	5.7	6.0	6.5	6.6	6.8	6.8	5.6	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Public administration and defence; compulsory social security (O)	3.7	3.6	3.6	3.6	4.1	4.5	4.6	4.7	4.8	4.8	4.9	4.5	4.5	4.6	4.6	4.6	4.6	4.6	4.6
Education (P)	3.0	3.1	3.2	3.2	3.4	3.5	3.5	3.6	3.8	3.8	3.9	3.9	3.9	4.0	4.0	4.0	4.0	4.0	4.0
Human health and social work activities (Q)	1.7	1.9	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Arts, entertainment and recreation (R); Other service activities (S); Activities of households as employers (T)	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.3	2.1	2.1	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Total Services	44.1	45.4	46.7	49.0	49.0	50.7	51.0	51.6	50.0	49.4	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.1
For memorandum: Manufacturing Share of GDP	32.2	31.2	30.9	29.6	29.6	28.6	28.8	28.5	28.7	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 2

China: Employment by Broad Sectors, 2012-2022

ANALYSIS BY GROUPS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
In thousands											
Total - all activities	767039.8	763010.1	763490.0	763199.7	762449.9	760579.9	757819.8	754469.6	750639.7	753222.2	751305.7
Agriculture, forestry and fishing	257730.0	238380.0	223720.0	214180.0	209080.0	202950.0	195150.0	186520.0	177150.0	179209.9	178753.9
Mining and quarrying	11260.4	11886.6	10995.9	9846.1	11461.1	7735.7	6475.3	6510.7	6703.8	6570.5	6553.8
Manufacturing	149780.5	151528.4	150333.2	146464.5	141029.3	137597.3	128548.3	129251.1	133084.4	133853.8	133513.2
Utilities and other activities	7100.1	6556.4	6545.0	6500.4	6321.7	6144.8	6106.0	6139.4	6321.6	6354.9	6338.7
Construction	64268.9	61448.6	62695.8	63628.9	64137.9	66142.1	72430.3	70438.7	69320.1	63492.4	63330.9
Services of the business economy - sections G to N	187804.9	206558.7	221288.2	248416.1	240393.7	247806.1	257530.3	262325.1	264132.4	268829.1	268145.1
Public admin, educ. & health; soc. & pers. serv.	89094.9	86651.4	87911.8	74163.8	90026.2	92203.8	91579.6	93284.6	93927.4	94911.7	94670.2
% of total											
Total - all activities	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, forestry and fishing	33.6	31.2	29.3	28.1	27.4	26.7	25.8	24.7	23.6	23.8	23.8

Mining and quarrying	1.5	1.6	1.4	1.3	1.5	1.0	0.9	0.9	0.9	0.9	0.9
Manufacturing	19.5	19.9	19.7	19.2	18.5	18.1	17.0	17.1	17.7	17.8	17.8
Utilities and other activities	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Construction	8.4	8.1	8.2	8.3	8.4	8.7	9.6	9.3	9.2	8.4	8.4
Services of the business economy - sections G to N	24.5	27.1	29.0	32.5	31.5	32.6	34.0	34.8	35.2	35.7	35.7
Public admin, educ. & health; soc. & pers. serv.	11.6	11.4	11.5	9.7	11.8	12.1	12.1	12.4	12.5	12.6	12.6
Total services	36.1	38.4	40.5	42.3	43.3	44.7	46.1	47.1	47.7	48.3	48.3

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 3

China: Employment Shares (% of Total Employment) by Services Sector, 2012-2022

ANALYSIS BY GROUPS		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services		4.5	5.2	5.9	7.0	7.1	7.7	7.7	7.9	8.0	8.4	8.4
Information and communication (J)		1.1	1.1	1.2	1.2	1.4	1.5	1.6	1.7	1.7	1.8	1.8
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)		0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2
Telecommunications (J61)		0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Computer programming, consultancy, and information service activities (J62-63)		0.5	0.6	0.7	0.7	0.9	1.0	1.2	1.3	1.3	1.3	1.3
Professional, scientific and technical activities (M)		2.3	2.5	2.8	3.0	3.2	3.4	3.2	3.3	3.3	3.5	3.5
Administrative and support service activities (N)		1.1	1.7	1.9	2.8	2.5	2.8	2.8	2.9	2.9	3.1	3.1
Enabling Services		4.7	5.4	5.4	5.7	5.5	5.6	5.1	5.2	5.3	5.1	5.1
Transportation and storage (H)		3.7	4.5	4.4	4.6	4.1	4.2	3.4	3.5	3.5	3.5	3.5
Land transport and transport via pipelines (H49)		2.2	2.3	2.3	2.2	2.1	2.2	1.8	1.9	1.9	1.8	1.8
Water transport (H50)		0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Air transport (H51)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Warehousing and support activities for transportation (H52)		0.8	1.4	1.4	1.6	1.4	1.3	1.0	1.1	1.1	1.1	1.1
Postal and courier activities (H53)		0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4

Financial and insurance activities (K)	1.0	0.9	1.0	1.1	1.3	1.4	1.7	1.7	1.7	1.7	1.7
Local Services	26.9	27.8	29.2	29.6	30.8	31.4	33.3	34.0	34.4	34.8	34.8
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	10.8	12.2	13.1	14.7	13.5	13.4	14.9	15.3	15.5	15.6	15.6
Accommodation and food service activities (I)	2.9	2.8	2.9	3.5	3.5	3.9	4.2	4.3	4.3	4.4	4.4
Real estate activities (L)	1.6	1.5	1.6	1.6	1.9	2.0	2.1	2.1	2.1	2.1	2.1
Public administration and defence; compulsory social security (O)	2.8	2.9	2.9	0.3	2.9	2.9	2.8	2.9	2.9	2.9	2.9
Education (P)	3.2	3.2	3.2	3.4	3.1	3.0	3.5	3.6	3.7	3.7	3.7
Human health and social work activities (Q)	2.7	1.7	1.7	1.8	1.7	1.8	1.9	2.0	2.0	2.1	2.1
Arts, entertainment and recreation (R)	0.4	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.8
Other service activities (S)	2.5	3.1	3.3	3.7	3.5	3.8	3.1	3.2	3.2	3.2	3.2
Activities of households as employers; undiff. goods- and services- (T)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Services	36.1	38.4	40.5	42.3	43.3	44.7	46.1	47.1	47.7	48.3	48.3

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 4

China: Value Added per Worker (\$000), 2012-2022

ANALYSIS BY GROUPS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)	21.4	25.6	27.8	30.6	27.7	28.7	33.0	31.1	32.3	37.0	37.4
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	14.2	20.4	24.4	30.1	26.2	30.2	42.4	36.9	38.7	43.9	44.4
Telecommunications (J61)	33.3	42.3	50.0	55.2	60.3	65.7	96.1	88.7	91.9	105.4	106.4
Computer programming, consultancy, and information service activities (J62-63)	14.7	18.3	18.7	20.1	17.0	17.1	17.8	17.7	18.4	21.0	21.2
Professional, scientific and technical activities (M)	9.2	9.6	9.7	10.4	9.5	10.3	12.8	15.7	16.6	19.0	19.1
Administrative and support service activities (N)	19.4	15.8	15.6	12.5	15.4	16.3	19.1	16.8	15.5	20.4	20.2
Enabling Services											
Transportation and storage (H)	13.8	12.6	14.1	14.2	16.0	17.6	23.9	27.4	26.1	32.5	32.9
Land transport and transport via pipelines (H49)	15.4	16.4	18.3	19.3	22.3	23.0	30.0	34.4	30.9	39.8	40.2
Water transport (H50)	34.9	39.8	51.0	60.3	63.4	77.7	115.0	138.0	142.8	178.4	180.6
Air transport (H51)	26.5	26.6	29.3	29.3	30.4	34.1	47.6	49.7	41.6	50.6	51.0
Warehousing and support activities for transportation (H52)	7.8	4.5	5.0	4.8	4.7	6.3	9.3	10.7	12.5	13.9	14.0
Postal and courier activities (H53)	5.0	5.7	6.6	6.9	6.9	7.4	10.0	11.9	12.5	15.2	15.3
Financial and insurance activities (K)	65.3	84.6	87.7	103.4	82.9	82.9	77.3	64.4	67.0	85.7	86.5
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	8.9	9.2	9.6	9.0	10.1	11.1	11.1	11.1	11.5	11.8	14.4	14.6
Accommodation and food service activities (I)	6.6	7.6	8.1	7.0	7.6	7.2	7.7	8.0	6.8	9.3	9.4	9.4
Real estate activities (L)	35.7	47.0	45.3	50.5	47.9	50.7	57.8	48.4	50.1	60.8	61.4	61.4
Public administration and defence; compulsory social security (O)	14.0	14.7	16.5	176.6	21.6	24.0	29.4	30.3	31.4	34.7	36.0	36.0
Education (P)	10.0	11.5	13.1	14.0	16.0	18.0	18.0	19.0	20.2	23.9	24.8	24.8
Human health and social work activities (Q)	6.6	13.8	15.8	16.3	18.4	19.6	20.6	20.5	21.0	24.1	24.3	24.3
Arts, entertainment and recreation (R)	17.5	15.3	16.8	18.9	15.8	17.1	15.1	12.7	11.8	16.6	16.5	16.5
Other service activities (S)	6.1	5.7	6.0	5.9	6.7	7.1	9.6	8.7	8.1	11.1	11.0	11.0
Activities of households as employers; undiff. goods- and services- (T)												

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 5

China: Domestic VA share in Gross Exports (EXGR_DVA; % of gross exports), 2012-2022

ANALYSIS BY GROUPS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)	88.6	88.8	89.5	89.8	91.3	92.5	93.1	91.2	92.1	91.9	92.1
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	89.7	89.5	90.4	92.1	92.3	92.8	93.1	92.5	93.0	93.0	92.9
Telecommunications (J61)	89.8	89.7	90.9	91.2	93.1	94.5	95.2	94.1	94.4	94.5	94.6
Computer programming, consultancy, and information service activities (J62-63)	84.8	86.6	87.5	87.3	89.4	91.4	92.1	89.9	91.3	90.9	91.2
Professional, scientific and technical activities (M)	83.2	86.8	87.5	85.9	90.1	87.8	87.7	91.1	89.7	91.5	91.6
Administrative and support service activities (N)	94.1	95.0	95.7	97.1	97.9	98.4	98.4	95.6	95.9	96.1	96.0
Enabling Services											
Transportation and storage (H)	81.6	82.1	83.2	85.4	86.3	86.7	85.5	86.6	88.1	85.7	85.0
Land transport and transport via pipelines (H49)	88.3	88.1	88.8	91.4	91.8	92.9	91.8	91.4	92.6	90.7	89.8
Water transport (H50)	80.6	78.3	79.5	83.1	81.8	83.4	81.4	82.1	85.8	81.7	80.9
Air transport (H51)	74.8	79.4	80.5	80.8	84.9	82.3	81.1	85.5	84.4	84.0	81.9
Warehousing and support activities for transportation (H52)	85.9	86.7	87.4	86.6	89.7	86.8	85.8	89.5	88.4	89.5	88.9
Postal and courier activities (H53)	87.7	88.8	89.5	89.8	91.5	90.0	89.9	91.9	92.0	92.9	92.7
Financial and insurance activities (K)	95.6	96.5	96.9	98.0	98.7	98.6	98.5	97.1	97.0	97.4	97.3
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	93.5	93.2	93.7	94.9	95.3	94.7	94.5	95.3	95.1	95.4	95.3
Accommodation and food service activities (I)	93.1	93.9	94.2	94.7	94.9	93.5	93.2	94.5	93.3	93.8	93.5
Real estate activities (L)	97.1	97.3	97.3	98.0	99.1	99.4	99.4	98.1	98.4	98.3	98.2
Public administration and defence; compulsory social security (O)	93.5	93.5	93.8	95.2	95.8	96.2	95.8	95.7	96.1	95.8	95.7
Education (P)	95.7	96.0	96.5	97.3	97.3	97.4	96.5	96.9	96.8	96.8	96.9
Human health and social work activities (Q)	91.9	90.4	90.9	92.4	93.2	93.7	93.3	92.5	92.9	92.0	92.0
Arts, entertainment and recreation (R)	97.1	96.2	96.7	97.2	98.7	98.5	98.6	95.3	96.0	95.6	95.6
Other service activities (S)	94.6	95.0	95.6	96.0	97.6	97.8	97.7	96.0	95.4	96.4	96.5
Activities of households as employers; undiff. goods- and services- (T)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 6

China: Domestic VA Share in Foreign Final Demand (FFD_DVA; % of value added), 2012-2022

ANALYSIS BY GROUPS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)	13.4	13.3	13.5	12.4	13.0	10.9	12.1	12.8	11.3	14.1	12.9
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	15.9	14.7	14.6	14.8	14.1	12.7	14.0	15.1	15.0	16.2	15.5
Telecommunications (J61)	13.8	16.0	15.8	12.2	14.9	10.3	10.9	12.9	9.4	13.6	13.0
Computer programming, consultancy, and information service activities (J62-63)	11.7	9.7	10.5	11.8	10.4	11.2	12.9	12.0	12.4	14.2	12.2
Professional, scientific and technical activities (M)	19.8	17.9	18.6	18.0	16.3	15.6	14.8	15.2	14.1	16.8	15.9
Administrative and support service activities (N)	22.9	21.9	22.4	20.3	19.2	17.9	16.7	16.3	17.0	18.2	17.6
Enabling Services											
Transportation and storage (H)	22.6	23.1	23.2	20.9	19.9	19.5	19.1	19.1	18.9	20.3	20.6
Land transport and transport via pipelines (H49)	18.8	19.6	20.0	17.5	17.4	16.9	16.8	16.8	16.3	17.8	18.5
Water transport (H50)	40.3	38.4	37.5	34.7	33.0	30.9	28.8	30.0	28.6	32.5	31.3
Air transport (H51)	38.8	35.8	34.6	32.5	28.6	27.3	24.9	28.1	26.7	30.2	28.2
Warehousing and support activities for transportation (H52)	24.3	25.2	25.3	23.0	22.1	23.0	21.1	20.0	20.7	21.1	21.4
Postal and courier activities (H53)	11.0	15.6	15.5	15.0	12.6	14.0	15.7	12.4	15.1	12.5	12.3
Financial and insurance activities (K)	15.0	13.8	14.3	14.6	12.7	12.4	10.8	9.0	9.7	10.1	10.7
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	23.0	23.2	23.7	22.2	20.9	20.3	20.1	21.8	21.3	23.2	24.2
Accommodation and food service activities (I)	9.8	10.0	10.4	9.8	9.2	8.0	7.4	7.5	6.3	7.6	7.9
Real estate activities (L)	4.5	4.7	4.9	4.9	4.3	3.6	3.3	3.5	3.1	3.7	3.7
Public administration and defence; compulsory social security (O)	0.1	0.2	0.3	0.4	0.3	0.1	0.1	0.2	0.1	0.2	0.2
Education (P)	0.4	0.5	0.4	0.3	0.4	0.2	0.2	0.3	0.2	0.3	0.3
Human health and social work activities (Q)	0.3	0.2	0.2	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Arts, entertainment and recreation (R)	5.6	5.3	5.5	5.7	6.4	6.2	7.3	8.2	8.2	9.0	8.0
Other service activities (S)	7.1	7.3	7.6	7.3	7.0	5.5	5.2	6.2	5.3	6.4	6.3
Activities of households as employers; undiff. goods- and services- (T)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 7

China: Domestic Employment Embodied in Gross Exports (EXGR_DEM; % of sector employment), 2012-2022

ANALYSIS BY GROUPS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)	17.1	15.3	14.9	18.2	15.5	13.5	16.0	18.5	18.2	22.1	18.4
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	33.0	30.1	28.4	41.3	27.7	28.1	32.3	32.3	33.9	30.8	28.4
Telecommunications (J61)	19.5	19.9	16.4	18.8	15.2	10.3	12.4	11.7	9.9	11.4	9.4
Computer programming, consultancy, and information service activities (J62-63)	9.4	9.1	11.3	13.5	13.3	12.2	14.8	18.4	18.1	23.4	19.3
Professional, scientific and technical activities (M)	17.2	15.9	15.7	12.8	11.8	11.8	11.1	10.9	10.5	12.8	10.6
Administrative and support service activities (N)	14.9	12.4	12.0	8.6	8.3	7.3	6.2	6.6	7.3	8.1	6.7
Enabling Services											
Transportation and storage (H)	13.1	12.0	11.9	11.2	10.7	9.1	8.9	8.5	8.3	9.5	8.8
Land transport and transport via pipelines (H49)	6.8	7.5	7.7	7.5	7.2	6.5	6.9	6.0	6.2	6.4	6.6
Water transport (H50)	92.0	97.5	105.8	118.1	113.8	98.4	87.8	91.5	85.9	106.7	89.6
Air transport (H51)	105.4	100.5	97.5	90.7	78.4	62.1	59.6	55.6	53.7	66.1	54.3
Warehousing and support activities for transportation (H52)	9.4	6.4	6.2	5.4	5.3	4.8	4.7	5.0	4.6	5.7	5.5
Postal and courier activities (H53)	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0
Financial and insurance activities (K)	3.3	3.2	3.2	2.4	1.7	1.7	1.4	1.7	1.9	2.1	1.8
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	11.8	12.9	12.6	10.8	10.5	10.5	10.3	11.5	11.2	12.2	12.8
Accommodation and food service activities (I)	6.1	5.5	4.8	4.5	3.9	2.8	3.2	2.8	0.8	0.9	0.8
Real estate activities (L)	1.4	1.2	1.2	1.2	0.8	0.8	0.7	0.8	0.6	0.8	0.6
Public administration and defence; compulsory social security (O)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Education (P)	0.3	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Human health and social work activities (Q)	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1
Arts, entertainment and recreation (R)	5.0	4.8	5.0	5.6	5.7	5.6	6.5	9.3	9.0	9.6	8.1
Other service activities (S)	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.3	0.1	0.1	0.1
Activities of households as employers; undiff. goods- and services- (T)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 8

China: Domestic Employment Embodied in Foreign Final Demand (FFD_DEM;
% of sector employment), 2012-2022

ANALYSIS BY GROUPS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)	13.2	12.2	12.4	12.3	11.9	11.2	12.7	12.5	12.1	14.3	12.6
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	15.9	14.7	14.6	14.8	14.1	12.7	14.1	15.1	15.0	16.2	15.5
Telecommunications (J61)	13.8	16.0	15.8	12.2	14.9	10.3	10.9	12.9	9.4	13.6	13.0
Computer programming, consultancy, and information service activities (J62-63)	11.7	9.7	10.5	11.8	10.4	11.2	12.9	12.0	12.4	14.2	12.2
Professional, scientific and technical activities (M)	19.8	17.9	18.6	18.0	16.3	15.6	14.8	15.2	14.1	16.8	15.9
Administrative and support service activities (N)	22.9	21.9	22.4	20.3	19.2	17.9	16.6	16.3	17.0	18.2	17.6
Enabling Services											
Transportation and storage (H)	20.6	22.0	22.1	20.1	19.2	19.1	18.5	17.9	18.1	18.9	19.2
Land transport and transport via pipelines (H49)	18.8	19.6	20.0	17.5	17.4	16.9	16.9	16.8	16.3	17.8	18.5
Water transport (H50)	40.3	38.4	37.5	34.7	33.0	30.9	28.8	30.0	28.6	32.5	31.3
Air transport (H51)	38.8	35.8	34.6	32.5	28.6	27.3	24.9	28.1	26.8	30.2	28.2
Warehousing and support activities for transportation (H52)	24.3	25.2	25.3	22.9	22.1	23.0	21.1	20.0	20.7	21.1	21.4
Postal and courier activities (H53)	11.0	15.6	15.5	15.0	12.6	14.0	15.7	12.4	15.1	12.5	12.3
Financial and insurance activities (K)	15.0	13.8	14.3	14.6	12.7	12.4	10.8	9.0	9.7	10.1	10.7
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	23.0	23.2	23.7	22.1	20.9	20.4	20.1	21.9	21.3	23.2	24.2
Accommodation and food service activities (I)	9.8	10.0	10.4	9.8	9.2	8.0	7.4	7.5	6.3	7.6	7.9
Real estate activities (L)	4.5	4.7	4.9	4.9	4.3	3.6	3.3	3.5	3.1	3.7	3.7
Public administration and defence; compulsory social security (O)	0.1	0.2	0.3	0.4	0.3	0.1	0.1	0.2	0.1	0.2	0.2
Education (P)	0.4	0.5	0.4	0.3	0.4	0.2	0.2	0.3	0.2	0.3	0.3
Human health and social work activities (Q)	0.3	0.2	0.2	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Arts, entertainment and recreation (R)	5.5	5.3	5.5	5.7	6.4	6.2	7.3	8.2	8.2	9.0	8.0
Other service activities (S)	7.1	7.3	7.6	7.3	7.0	5.5	5.2	6.2	5.3	6.4	6.3
Activities of households as employers; undiff. goods- and services- (T)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 9

China: HR Backward Linkage Index (normalized), 2012-2022

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)											
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	1.0304	1.0402	0.9989	0.9745	0.9480	0.9365	0.8952	0.9364	0.9482	0.9329	0.9340
Telecommunications (J61)	0.9236	0.9016	0.8576	0.8426	0.7866	0.7591	0.7108	0.7636	0.7671	0.7600	0.7647
Computer programming, consultancy, and information service activities (J62-63)	1.0139	1.0294	0.9919	0.9552	0.9338	0.8889	0.8559	0.9370	0.9197	0.9379	0.9413
Professional, scientific and technical activities (M)	1.1464	1.1781	1.1553	1.1340	1.0927	1.1115	1.1038	1.0271	1.0359	1.0305	1.0318
Administrative and support service activities (N)	0.6766	0.6668	0.6205	0.5611	0.5320	0.5281	0.5320	0.6969	0.7181	0.7077	0.7100
Enabling Services											
Transportation and storage (H)											
Land transport and transport via pipelines (H49)	0.8993	0.9178	0.9108	0.9241	0.9117	0.8942	0.9146	0.8622	0.9287	0.8975	0.8898
Water transport (H50)	0.9369	0.9040	0.9007	0.9175	0.9615	0.9940	0.9641	0.8928	0.9578	0.8835	0.8821
Air transport (H51)	1.0490	1.0212	1.0181	1.0162	1.0659	1.0631	1.0438	0.9588	1.0281	1.0232	1.0074
Warehousing and support activities for transportation (H52)	0.9644	1.0141	1.0002	0.9632	1.0236	0.9900	0.9781	0.9820	0.9561	0.9838	0.9785
Postal and courier activities (H53)	0.9910	0.9703	0.9572	0.9539	0.9892	1.0201	1.0086	0.9264	0.9659	0.9408	0.9439

Financial and insurance activities (K)	0.7006	0.6659	0.6278	0.5567	0.5373	0.5588	0.5695	0.7069	0.7162	0.7048	0.7101
Local Services											
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	0.7787	0.8198	0.7932	0.7481	0.7634	0.7473	0.7557	0.7706	0.7586	0.7695	0.7703
Accommodation and food service activities (I)	0.9931	0.9896	0.9770	0.9576	1.0147	1.0232	1.0468	1.0074	1.0395	1.0376	1.0353
Real estate activities (L)	0.6561	0.6363	0.6291	0.5790	0.5115	0.5043	0.5064	0.6228	0.6097	0.6158	0.6189
Public administration and defence; compulsory social security (O)	0.7841	0.8059	0.7942	0.7049	0.7381	0.6992	0.7258	0.7421	0.7354	0.7502	0.7521
Education (P)	0.6439	0.6672	0.6388	0.5692	0.6302	0.6015	0.6535	0.6608	0.6490	0.6779	0.6629
Human health and social work activities (Q)	1.0126	1.0261	0.9854	0.9590	0.9033	0.9070	0.9071	0.9230	0.9143	0.9335	0.9401
Arts, entertainment and recreation (R)	0.5991	0.6693	0.6377	0.6100	0.5227	0.5668	0.5620	0.8012	0.7968	0.8069	0.8082
Other service activities (S)	0.6818	0.6860	0.6554	0.6207	0.5772	0.5682	0.5755	0.6589	0.7064	0.6605	0.6719
Activities of households as employers; undiff. goods- and services- (T)	0.4277	0.4241	0.4137	0.3918	0.4158	0.4330	0.4386	0.4390	0.4350	0.4444	0.4466

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 10

China: HR Forward Linkage Index (normalized), 2012-2022

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)											
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	0.5974	0.6592	0.6721	0.6218	0.6461	0.5857	0.5990	0.6385	0.6469	0.6988	0.7128
Telecommunications (J61)	0.8524	0.9472	0.9726	0.8359	0.9696	0.8610	0.8411	0.9621	0.8438	0.9611	0.9764
Computer programming, consultancy, and information service activities (J62-63)	0.7110	0.7730	0.7369	0.6831	0.6661	0.6084	0.6088	0.5875	0.5449	0.5439	0.5511
Professional, scientific and technical activities (M)	1.0550	1.0829	1.0799	1.0658	1.0638	1.0149	1.0087	1.0392	0.9794	1.0226	1.0284
Administrative and support service activities (N)	1.0369	1.0724	1.0624	1.0259	1.0718	1.0385	1.0428	1.1123	1.0716	1.1132	1.1266
Enabling Services											
Transportation and storage (H)											
Land transport and transport via pipelines (H49)	1.1209	1.1943	1.1967	1.0965	1.1918	1.1147	1.1529	1.2092	1.1393	1.2130	1.2106
Water transport (H50)	1.0287	1.0990	1.1184	1.1143	1.1758	1.1411	1.1680	1.2229	1.1593	1.1837	1.2252
Air transport (H51)	0.9710	1.0455	1.0509	0.9957	1.0857	1.0542	1.0634	1.0748	1.0422	1.0700	1.1073
Warehousing and support activities for transportation (H52)	1.2924	1.3594	1.3585	1.2874	1.3664	1.2911	1.2536	1.3417	1.2320	1.3309	1.3417
Postal and courier activities (H53)	1.1475	1.2754	1.2469	1.1604	1.1629	1.1203	1.2325	1.2198	1.1940	1.2102	1.2246

Financial and insurance activities (K)	1.1101	1.0979	1.0907	1.0993	1.0768	1.0880	1.0200	0.9592	0.9730	0.9720	0.9843
Local Services											
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	0.9801	1.0002	1.0033	0.9977	1.0040	0.9846	0.9854	1.0100	0.9920	1.0101	1.0127
Accommodation and food service activities (I)	0.7746	0.7832	0.7953	0.7759	0.8029	0.7906	0.7599	0.7712	0.7788	0.8129	0.8271
Real estate activities (L)	0.5845	0.5860	0.5819	0.5727	0.5758	0.5664	0.5613	0.5663	0.5657	0.5725	0.5763
Public administration and defence; compulsory social security (O)	0.3950	0.3909	0.3864	0.3711	0.3893	0.3952	0.3991	0.4037	0.3974	0.4099	0.4121
Education (P)	0.4017	0.3987	0.3916	0.3706	0.3933	0.4024	0.4085	0.4124	0.4064	0.4183	0.4206
Human health and social work activities (Q)	0.3951	0.3873	0.3796	0.3669	0.3796	0.3941	0.4006	0.3990	0.3976	0.4037	0.4058
Arts, entertainment and recreation (R)	0.5036	0.4942	0.4818	0.4645	0.4631	0.4866	0.5005	0.5064	0.5220	0.5512	0.5588
Other service activities (S)	0.7375	0.7480	0.7514	0.7311	0.7605	0.7029	0.7036	0.7573	0.7229	0.7683	0.7762
Activities of households as employers; undiff. goods- and services- (T)	0.3884	0.3789	0.3699	0.3519	0.3719	0.3881	0.3917	0.3929	0.3890	0.3969	0.3985

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 11

China: Employment Multipliers, 2012-2022

Unit: jobs per \$1,000 of additional final demand

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)											
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	0.0743	0.0561	0.0503	0.0548	0.0475	0.0455	0.0363	0.0355	0.0377	0.0293	0.0292
Telecommunications (J61)	0.0422	0.0366	0.0324	0.0324	0.0279	0.0246	0.0182	0.0195	0.0199	0.0159	0.0161
Computer programming, consultancy, and information service activities (J62-63)	0.0561	0.0550	0.0530	0.0467	0.0548	0.0489	0.0455	0.0489	0.0444	0.0410	0.0408
Professional, scientific and technical activities (M)	0.0751	0.0700	0.0679	0.0660	0.0695	0.0645	0.0553	0.0518	0.0502	0.0428	0.0426
Administrative and support service activities (N)	0.0543	0.0634	0.0632	0.0764	0.0643	0.0609	0.0521	0.0566	0.0599	0.0470	0.0472
Enabling Services											
Transportation and storage (H)											
Land transport and transport via pipelines (H49)	0.0576	0.0565	0.0525	0.0513	0.0486	0.0413	0.0343	0.0318	0.0335	0.0268	0.0265
Water transport (H50)	0.0362	0.0385	0.0352	0.0359	0.0347	0.0265	0.0189	0.0188	0.0177	0.0148	0.0144
Air transport (H51)	0.0394	0.0468	0.0449	0.0450	0.0469	0.0375	0.0307	0.0289	0.0304	0.0250	0.0241
Warehousing and support activities for transportation (H52)	0.0989	0.1138	0.1050	0.1103	0.1047	0.0844	0.0614	0.0597	0.0529	0.0478	0.0473
Postal and courier activities (H53)	0.1214	0.1087	0.0966	0.0990	0.0898	0.0829	0.0651	0.0610	0.0584	0.0494	0.0493

Financial and insurance activities (K)	0.0303	0.0209	0.0191	0.0185	0.0164	0.0178	0.0179	0.0223	0.0248	0.0177	0.0178
Local Services											
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	0.0914	0.0900	0.0859	0.0873	0.0825	0.0748	0.0721	0.0719	0.0686	0.0584	0.0579
Accommodation and food service activities (I)	0.1493	0.1325	0.1213	0.1244	0.1184	0.1103	0.1011	0.1004	0.0997	0.0820	0.0815
Real estate activities (L)	0.0341	0.0261	0.0262	0.0255	0.0228	0.0213	0.0188	0.0234	0.0237	0.0186	0.0186
Public administration and defence; compulsory social security (O)	0.0727	0.0675	0.0616	0.0260	0.0512	0.0466	0.0396	0.0377	0.0376	0.0318	0.0310
Education (P)	0.0944	0.0836	0.0744	0.0702	0.0630	0.0555	0.0537	0.0521	0.0490	0.0414	0.0402
Human health and social work activities (Q)	0.1181	0.0698	0.0632	0.0660	0.0563	0.0553	0.0511	0.0467	0.0491	0.0388	0.0385
Arts, entertainment and recreation (R)	0.0644	0.0665	0.0610	0.0587	0.0632	0.0593	0.0652	0.0683	0.0740	0.0538	0.0545
Other service activities (S)	0.1376	0.1459	0.1396	0.1427	0.1331	0.1278	0.0952	0.0986	0.1012	0.0785	0.0791
Activities of households as employers; undiff. goods- and services- (T)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 12

China: Foreign value added in gross exports (EXGR_FVA; % of gross exports), 2012-2022

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)	11.4	11.2	10.5	10.2	8.7	7.5	6.9	8.8	7.9	8.1	7.9
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	10.3	10.5	9.6	7.9	7.7	7.2	6.9	7.5	7.0	7.0	7.1
Telecommunications (J61)	10.2	10.3	9.1	8.8	6.9	5.5	4.8	5.9	5.6	5.5	5.4
Computer programming, consultancy, and information service activities (J62-63)	15.2	13.4	12.5	12.7	10.6	8.6	7.9	10.1	8.7	9.1	8.8
Professional, scientific and technical activities (M)	16.8	13.2	12.5	14.1	9.9	12.2	12.3	8.9	10.3	8.5	8.4
Administrative and support service activities (N)	5.9	5.0	4.3	2.9	2.1	1.6	1.6	4.4	4.1	3.9	4.0
Enabling Services											
Transportation and storage (H)	18.4	17.9	16.8	14.6	13.7	13.3	14.5	13.4	11.9	14.3	15.0
Land transport and transport via pipelines (H49)	11.7	11.9	11.2	8.6	8.2	7.1	8.2	8.6	7.4	9.3	10.2
Water transport (H50)	19.4	21.7	20.5	16.9	18.2	16.6	18.6	17.9	14.2	18.3	19.1
Air transport (H51)	25.2	20.6	19.5	19.2	15.1	17.7	18.9	14.5	15.6	16.0	18.1
Warehousing and support activities for transportation (H52)	14.1	13.3	12.6	13.4	10.3	13.2	14.2	10.5	11.6	10.5	11.1
Postal and courier activities (H53)	12.3	11.2	10.5	10.2	8.5	10.0	10.1	8.1	8.0	7.1	7.3
Financial and insurance activities (K)	4.4	3.5	3.1	2.0	1.3	1.4	1.5	2.9	3.0	2.6	2.7
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	6.5	6.8	6.3	5.1	4.7	5.3	5.5	4.7	4.9	4.6	4.7
Accommodation and food service activities (I)	6.9	6.1	5.8	5.3	5.1	6.5	6.8	5.5	6.7	6.2	6.5
Real estate activities (L)	2.9	2.7	2.7	2.0	0.9	0.6	0.6	1.9	1.6	1.7	1.8
Public administration and defence; compulsory social security (O)	6.5	6.5	6.2	4.8	4.2	3.8	4.2	4.3	3.9	4.2	4.3
Education (P)	4.3	4.0	3.5	2.7	2.7	2.6	3.5	3.1	3.2	3.2	3.1
Human health and social work activities (Q)	8.1	9.6	9.1	7.6	6.8	6.3	6.7	7.5	7.1	8.0	8.0
Arts, entertainment and recreation (R)	2.9	3.8	3.3	2.8	1.3	1.5	1.4	4.7	4.0	4.4	4.4
Other service activities (S)	5.4	5.0	4.4	4.0	2.4	2.2	2.3	4.0	4.6	3.6	3.5
Activities of households as employers; undiff. goods- and services- (T)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 13

China: Domestic value added in foreign gross exports (FEXGR_DVA; % of value-added), 2012-2022

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)	28.6	29.1	30.9	35.8	39.2	50.4	50.1	56.5	67.2	74.4	73.3
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	8.2	7.9	8.5	9.3	9.5	9.5	10.2	11.2	13.1	13.8	13.2
Telecommunications (J61)	10.1	9.7	9.2	10.3	10.7	11.3	10.2	10.6	10.7	11.1	11.3
Computer programming, consultancy, and information service activities (J62-63)	10.3	11.4	13.2	16.3	19.1	29.6	29.8	34.6	43.5	49.4	48.7
Professional, scientific and technical activities (M)	19.5	20.1	21.9	24.0	25.1	25.7	26.3	29.1	30.5	32.5	33.2
Administrative and support service activities (N)	14.4	14.5	15.9	16.5	17.1	17.0	17.3	19.2	18.8	19.6	21.4
Enabling Services											
Transportation and storage (H)	99.5	92.8	88.0	97.4	97.2	96.7	99.6	108.3	110.2	121.7	111.5
Land transport and transport via pipelines (H49)	14.7	14.8	14.5	15.3	15.5	15.9	16.3	17.4	14.9	15.3	17.3
Water transport (H50)	46.1	42.7	40.0	45.4	44.1	43.1	46.3	51.3	59.8	68.3	54.7
Air transport (H51)	29.2	25.3	23.7	25.1	25.6	25.7	24.3	26.7	21.0	23.2	24.5
Warehousing and support activities for transportation (H52)	8.1	8.6	8.4	10.4	10.7	10.6	11.3	11.4	12.8	13.5	13.6
Postal and courier activities (H53)	1.4	1.4	1.4	1.3	1.3	1.4	1.5	1.5	1.7	1.6	1.4
Financial and insurance activities (K)	23.0	22.6	22.6	22.9	24.2	23.3	23.9	24.4	23.9	27.0	24.4
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	78.9	76.9	78.6	82.5	80.7	81.5	81.8	87.7	90.4	94.7	95.1
Accommodation and food service activities (I)	14.7	15.1	15.9	17.4	18.0	18.5	19.2	20.8	9.0	9.2	15.0
Real estate activities (L)	1.6	1.6	1.6	1.8	1.9	1.9	2.0	2.2	1.5	1.6	2.1
Public administration and defence; compulsory social security (O)	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6
Education (P)	1.8	1.9	2.0	2.2	2.4	2.4	2.3	2.5	1.8	1.3	1.8
Human health and social work activities (Q)	1.1	1.1	1.1	1.2	1.2	1.3	1.2	1.3	0.9	0.7	0.8
Arts, entertainment and recreation (R)	3.4	3.5	3.7	4.1	4.3	4.5	4.7	5.4	4.2	4.1	4.6
Other service activities (S)	1.4	1.5	1.5	1.7	1.7	1.7	1.7	1.7	0.8	0.7	1.0
Activities of households as employers; undiff. goods- and services- (T)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 14

China: Value-Added Multipliers, 2012-2022

Unit: dollars of value added per dollar of additional final demand

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)											
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	0.8452	0.8489	0.8598	0.8713	0.8861	0.8881	0.8941	0.8885	0.8862	0.8928	0.8913
Telecommunications (J61)	0.8581	0.8603	0.8755	0.8776	0.9054	0.9226	0.9331	0.9185	0.9186	0.9225	0.9230
Computer programming, consultancy, and information service activities (J62-63)	0.7888	0.8154	0.8266	0.8229	0.8516	0.8766	0.8866	0.8576	0.8692	0.8672	0.8706
Professional, scientific and technical activities (M)	0.7539	0.8127	0.8207	0.7919	0.8544	0.8207	0.8200	0.8693	0.8427	0.8724	0.8733
Administrative and support service activities (N)	0.9034	0.9311	0.9407	0.9523	0.9711	0.9759	0.9756	0.9373	0.9324	0.9420	0.9406
Enabling Services											
Transportation and storage (H)											
Land transport and transport via pipelines (H49)	0.7862	0.7980	0.8049	0.8448	0.8422	0.8671	0.8550	0.8382	0.8591	0.8224	0.8127
Water transport (H50)	0.7709	0.7532	0.7642	0.7990	0.7879	0.8006	0.7829	0.7952	0.8244	0.7873	0.7799
Air transport (H51)	0.7055	0.7598	0.7693	0.7696	0.8146	0.7818	0.7705	0.8276	0.8036	0.8091	0.7885
Warehousing and support activities for transportation (H52)	0.7741	0.8142	0.8218	0.7956	0.8489	0.7682	0.7619	0.8484	0.7868	0.8454	0.8390
Postal and courier activities (H53)	0.8142	0.8403	0.8481	0.8510	0.8690	0.8447	0.8444	0.8751	0.8652	0.8839	0.8838

Financial and insurance activities (K)	0.9336	0.9520	0.9575	0.9688	0.9806	0.9778	0.9762	0.9566	0.9481	0.9590	0.9562
Local Services											
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	0.9042	0.8990	0.9055	0.9244	0.9267	0.9218	0.9196	0.9264	0.9253	0.9268	0.9238
Accommodation and food service activities (I)	0.8950	0.8910	0.8935	0.9186	0.9016	0.9032	0.8984	0.8921	0.9020	0.8817	0.8776
Real estate activities (L)	0.9556	0.9620	0.9625	0.9706	0.9865	0.9898	0.9899	0.9717	0.9724	0.9740	0.9728
Public administration and defence; compulsory social security (O)	0.8944	0.9037	0.9060	0.9247	0.9323	0.9400	0.9330	0.9313	0.9340	0.9319	0.9303
Education (P)	0.9376	0.9411	0.9470	0.9603	0.9565	0.9598	0.9464	0.9512	0.9489	0.9499	0.9524
Human health and social work activities (Q)	0.8771	0.8577	0.8639	0.8877	0.8953	0.9046	0.8999	0.8869	0.8945	0.8799	0.8808
Arts, entertainment and recreation (R)	0.9558	0.9441	0.9499	0.9572	0.9790	0.9714	0.9724	0.9258	0.9202	0.9282	0.9263
Other service activities (S)	0.9222	0.9279	0.9355	0.9411	0.9637	0.9675	0.9659	0.9404	0.9303	0.9454	0.9460
Activities of households as employers; undiff. goods- and services- (T)											

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 15

China: Labor Income Share (of value added), 2012-2022

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)											
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	53.2	55.4	57.6	59.8	62.0	64.2	64.4	65.3	66.2	64.9	65.6
Telecommunications (J61)	18.9	20.0	21.1	22.2	23.2	24.3	24.0	24.2	24.4	25.6	26.0
Computer programming, consultancy, and information service activities (J62-63)	58.7	55.6	52.4	49.3	46.1	43.0	44.6	49.1	53.7	53.8	54.7
Professional, scientific and technical activities (M)	54.7	55.5	55.6	55.7	56.0	56.1	56.1	56.2	57.0	56.1	56.2
Administrative and support service activities (N)	32.6	32.8	33.0	33.1	33.3	33.5	31.4	33.1	35.0	34.1	33.4
Enabling Services											
Transportation and storage (H)											
Land transport and transport via pipelines (H49)	49.2	47.4	45.6	43.9	42.1	40.3	39.1	40.5	41.9	41.9	41.8
Water transport (H50)	35.9	35.9	35.9	35.9	35.8	35.8	36.8	37.7	38.5	42.2	39.1
Air transport (H51)	44.1	43.3	42.5	41.6	40.8	40.0	39.6	40.4	41.1	45.4	45.6
Warehousing and support activities for transportation (H52)	40.5	45.6	50.6	55.7	60.8	65.9	66.9	67.5	68.2	67.6	65.4
Postal and courier activities (H53)	79.1	81.2	83.3	85.5	87.6	89.7	89.4	89.7	90.1	89.3	89.6
Financial and insurance activities (K)	54.7	55.5	55.6	55.7	56.0	56.1	56.1	56.5	56.8	55.7	53.6
Local Services											

Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	54.7	55.5	55.6	55.7	56.0	56.1	56.1	56.5	56.8	55.7	55.1
Accommodation and food service activities (I)	54.7	55.5	55.6	55.7	56.0	56.1	56.1	56.5	56.8	55.7	55.4
Real estate activities (L)	54.7	55.5	55.6	55.7	56.0	56.1	56.1	56.5	56.8	55.7	56.0
Public administration and defence; compulsory social security (O)	87.0	88.2	89.3	90.5	86.9	83.2	82.8	82.8	82.7	82.6	82.5
Education (P)	85.8	85.9	86.1	86.3	80.2	74.2	74.1	74.8	75.4	75.4	75.2
Human health and social work activities (Q)	83.6	85.0	86.4	87.9	84.7	81.6	81.7	82.1	82.5	82.4	82.3
Arts, entertainment and recreation (R)	55.7	56.5	57.4	58.2	59.0	59.9	59.6	61.3	63.0	61.3	59.2
Other service activities (S)	39.9	38.6	36.7	37.3	37.5	36.0	39.4	37.2	41.6	39.9	40.9
Activities of households as employers; undiff. goods- and services- (T)											

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

Table 16

China: Labor Income Multipliers, 2012-2022

Unit: dollars of labor income per dollar of additional final demand

Service classification	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Knowledge Services											
Information and communication (J)											
Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (J58-60)	0.4583	0.4658	0.4795	0.5005	0.4941	0.5142	0.5255	0.5117	0.5231	0.5205	0.5243
Telecommunications (J61)	0.2797	0.2930	0.2996	0.3133	0.3111	0.3172	0.3126	0.3111	0.3169	0.3276	0.3325
Computer programming, consultancy, and information service activities (J62-63)	0.4305	0.4487	0.4475	0.4235	0.4389	0.4254	0.4398	0.4555	0.4656	0.4867	0.4916
Professional, scientific and technical activities (M)	0.3853	0.4227	0.4295	0.4165	0.4507	0.4366	0.4391	0.4660	0.4556	0.4739	0.4747
Administrative and support service activities (N)	0.4761	0.5050	0.5153	0.5228	0.5413	0.5474	0.5530	0.5245	0.5344	0.5388	0.5348
Enabling Services											
Transportation and storage (H)											
Land transport and transport via pipelines (H49)	0.3943	0.3970	0.3963	0.4117	0.4008	0.4098	0.4014	0.3852	0.4047	0.3892	0.3802
Water transport (H50)	0.3219	0.3287	0.3389	0.3471	0.3516	0.3383	0.3333	0.3526	0.3564	0.3726	0.3563
Air transport (H51)	0.3210	0.3541	0.3623	0.3727	0.3857	0.3671	0.3626	0.3798	0.3728	0.3816	0.3686
Warehousing and support activities for transportation (H52)	0.3894	0.4058	0.4289	0.4237	0.4586	0.4057	0.4016	0.4693	0.4310	0.4824	0.4658
Postal and courier activities (H53)	0.5340	0.5617	0.5824	0.5836	0.6020	0.5889	0.5972	0.6505	0.6326	0.6738	0.6769

Financial and insurance activities (K)	0.4909	0.5112	0.5086	0.5217	0.5320	0.5340	0.5346	0.5190	0.5137	0.5210	0.5068
Local Services											
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	0.4693	0.4813	0.4884	0.4953	0.5007	0.5003	0.5021	0.5093	0.5056	0.5111	0.5095
Accommodation and food service activities (I)	0.5162	0.5365	0.5421	0.5414	0.5536	0.5371	0.5422	0.5557	0.5516	0.5566	0.5595
Real estate activities (L)	0.3994	0.4072	0.4131	0.4133	0.4081	0.4097	0.4104	0.4122	0.4147	0.4156	0.4203
Public administration and defence; compulsory social security (O)	0.6291	0.6383	0.6386	0.6714	0.6688	0.6828	0.6713	0.6694	0.6707	0.6742	0.6641
Education (P)	0.7625	0.7644	0.7769	0.7982	0.7400	0.7122	0.6932	0.7035	0.7022	0.7074	0.7127
Human health and social work activities (Q)	0.5878	0.5598	0.5735	0.6007	0.6058	0.6304	0.6314	0.6047	0.6257	0.5990	0.6045
Arts, entertainment and recreation (R)	0.5597	0.5483	0.5626	0.5744	0.5989	0.5945	0.6053	0.5529	0.5704	0.5735	0.5719
Other service activities (S)	0.3912	0.4091	0.3923	0.3899	0.4059	0.4058	0.4171	0.4012	0.4205	0.4141	0.4321
Activities of households as employers; undiff. goods- and services- (T)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Author's calculations from OECD (2025), Trade in Value Added, Trade in Employment, and ICIO databases.

ABOUT THE AUTHOR

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Growth and Transformation, LLC., VA, USA. Previously, he spent over 35 years working at the World Bank Group where his last position was Lead Economist in the Office of the Senior Vice President and Chief Economist. He has authored and co-authored books published by the World Bank, Oxford University, and the Policy Center for the New South, and has written articles in professional journals covering public finance, international finance, and industrialization. His latest books include Tales from the Development Frontier (2013), Light Manufacturing in Vietnam (2013), Jobs, Industrialization, and Globalization (2017), Morocco (2020), COVID-19 and Developing Countries (2022), and Vietnam's Economic Leap: Productivity, Innovation, and the Road to High-Income Status (2025).

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