CONTESTED, TEMPORARY AND UNEVEN: VALUE CAPTURE DYNAMICS IN THE SERBIAN IT SECTOR

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AUTHOR'S DECLARATION

I, the undersigned, **Slobodan Golušin**, candidate for the PhD degree in Sociology and Social Anthropology declare herewith that the present thesis titled "Contested, temporary and uneven: Value capture dynamics in the Serbian IT sector" is exclusively my own work, based on my research and only such external information as properly credited in notes and bibliography. I declare that no unidentified and illegitimate use was made of the work of others, and no part of the thesis infringes on any person's or institution's copyright. I also declare that no part of the thesis has been submitted in this form to any other institution of higher education for an academic degree.

Vienna, 30 October 2025

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DECLARATION OF GENERATIVE AI

Generative artificial intelligence (GenAI) was used in this work. I, the author, have reviewed and edited the content as needed and take full responsibility for the content, claims, and references.

I used Grammarly to proofread and edit the thesis[1]. The tool was used to provide suggestions for grammar and style improvements in the text.

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[1] https://www.grammarly.com/

ABSTRACT

The thesis explores the evolution of value-capture dynamics in the Serbian IT sector, from its initial incorporation into global outsourcing networks to the present. This outsourcing-dominated sector is simultaneously hailed as a major developmental avenue with immense opportunities for workers and firms, yet also cast as peripheral and fragile. Moving beyond narratives of economic development as either guaranteed by integration into global production or constrained by global economic dependencies, I analyse development through the economic geography literature, centering on the concept of value capture. Throughout the thesis I show how the distributional outcomes of IT outsourcing are contested, temporary, and uneven, shaped by constant global competition within shifting economic cycles and embedded in uneven economic geographies. I conceptualise three phases in the Serbian IT sector development: integration, expansion, and contraction, based on how each phase structures value-capture dynamics for local firms and workers. In the integration phase, I analyse value capture through intermediation between low-cost local labour and foreign clients; in the expansion phase, I examine intensifying inter-firm competition, economic upgrading and value capture trajectories of workers; and in the third, contraction phase, I explore the shrinking scope for value capture and the limits of the outsourcing model. For each phase I show how firms and workers navigate shifting windows of opportunity. Conceptually, the thesis advances multifaceted notions of economic development and value capture through examination of IT outsourcing. The thesis is grounded in an empirical study of Serbian IT firms and workers conducted between 2021 and 2025.

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INTRODUCTION

Context and research questions

The Serbian IT sector[2] is usually portrayed in public discourse with one of the two images of economic development. On the one hand, it is celebrated as an unprecedented economic success, generating high profits, record exports, and high-paying jobs in an opportunity-scarce economy, acting as an engine of economic development. On the other hand, it is also portrayed as being overly dependent on foreign capital, remaining trapped in low-level outsourcing[3], and having limited impacts on broader economic development. Likewise, while constantly expanding and instilling expectations of infinite growth and opportunities, the sector also faces sharp crises and downturns, followed by doomsday commentaries. Such contradictory visions also point to broader debates about economic development – whether integration into global production opens a path to general development or reproduces existing global economic asymmetries, and who gets what out of such integration. This thesis responds to these debates and, through the investigation of the Serbian IT sector, shows the contested, temporary, and uneven dynamics of value capture within broader cycles of IT outsourcing.

The IT sector has become a key industry in Serbia, often perceived as a beacon of hope for the economy generally characterised by low-value activities. The sector has been growing rapidly for the past two decades. From being a peripheral economic activity in the early 2000s, it now accounts for 5% of GDP, with disproportionately high exports and added value. Exports in

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[2] By IT sector I understand economic activities related to information technology including software, hardware and services, although in this thesis I use it mostly to refer to the software subsector. However, some statistics below might consider the ICT sector more broadly, which also includes telecommunications. Since many IT workers also work in other sectors, the analysis would also account for them.

[3] Outsourcing can be defined as contracting the third-party service provider for completion of specified work (Kotlarsky & Willcocks, 2009). As my research takes the perspective of the country where work is being outsourced to, I use this concept to refer to moving of work across borders in different forms – either through dependent or independent subsidiariesor individual workers (Peck, 2017).

2024 amounted to over 4 billion euros, a more than tenfold increase from only a decade before.[45] The sector also experienced a significant profitability growth. For example, from 2022 to 2023, at the peak of sectoral expansion, profitability grew by almost 60%.[6] Not only companies but also workers benefited from the sector's growth, which provided high-paying jobs for tens of thousands of workers in an otherwise opportunity-scarce environment. From 2012 to 2024, employment in the sector tripled, reaching around 125,000,[7] and it consistently had the highest salaries in the country. In October 2024, the average net salary in the sector was officially around EUR 2,400, tripling from the 2013 average[8] and roughly three times the average salary in Serbia.[9] Consequently, for over a decade, pursuing a career in the sector has been perceived as a jump board towards a better life in a market with few opportunities. The number of graduates in IT-related fields drastically increased over time, reaching around 20% of all students, which indicative of its promise of economic opportunities for Serbian youth.

These trends were well reflected in the public discourse, celebrating the sector's developmental potential. The IT sector has been consistently presented by politicians and business representatives as Serbia´s main economic development opportunity.[10] As a former prime minister of Serbia (2017-2024), Ana Brnabić once said, IT is the ´spine of the development´ of

[4] Serbian government website data: https://welcometoserbia.test-uzda.gov.rs/ubrzani-rast-it-industrije
[5] Ministry of Information and Telecommunication of Serbia website data: https://mit.gov.rs/vest/sr/7206/izvoz-ikt-proizvoda-i-usluga-uvecan-za-205-u-prvih-pet-meseci-2024-godine.php
[6] Serbian National Enterprise Registry Agency, reported by Nova Ekonomija: https://novaekonomija.rs/vesti-iz-zemlje/profit-najbrze-rastao-u-ikt-i-gradjevinarstvu-srpska-prvreda-ponovo-u-plusu
[7] Government website data: https://welcometoserbia.test-uzda.gov.rs/ubrzani-rast-it-industrije
[8] FenixHR conducted the most comprehensive longitudinal research on work conditions and salaries in teh Serbian IT sector: https://www.fenixhr.com/index.html
[9] Serbian National Statistical Agency, reported by Nova Ekonomija: https://novaekonomija.rs/vesti-iz-zemlje/prosecna-neto-plata-oko-86-000-dinara-programerska-preko-2-000-evra
[10] A public statement by Serbian minister of Information and Telecommunications, reported by NIN: ohttps://www.nin.rs/ekonomija/vesti/43257/izvoz-ikt-sektora-srbije-u-2023-veci-od-35-milijarde-evra-do-kraja-2024-tender-za-5g; Robert C. Wolcott, "National Digital Transformation: A Conversation With Serbia's Prime Minister Ana Brnabic," Forbes, accessed July 10, 2022, https://www.forbes.com/sites/robertwolcott/2021/06/15/national-digital-transformation-a-conversation-with-serbias-prime-minister-ana-brnabic/

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the Serbian economy.[11] On multiple other occasions, she has also spoken about Serbia's potential to become one of the leaders of the '4th Industrial Revolution' due to its strong tech sector, which would enable Serbia to 'catch up' with other developed economies.[12] This sentiment was also widely shared by other government representatives.[13]

The industry was equally optimistic about the sector´s prospects. As the former president of a major industry association, 'Digital Serbia', once said, this is the first industrial revolution in which Serbia can participate and take a high position in the global labour division, previously reserved only for rich countries.[14] This is so, he claimed, because "for business, you simply need a computer and good ideas".[15] This significant development is then expected to spill over and bring economic benefits to the country more broadly. Similarly, the representative of the largest start-up association in Serbia believes that the tide of the IT sector slowly lifts the society's boat,[16] while, due to the digital revolution, a famous start-up founder claimed, "for the first time, our children have a chance to compete on the global market".[17] Thus, according

[11] "Brnabić: IT sektor ima potencijal da bude kičma razvoja," N1, August 11, 2017, https://rs.n1info.com/biznis/a290187-Brnabic-IT-sektor-ima-potencijal-da-bude-kicma-razvoja/.
[12] Blic, "REVOLUCIJA, I TO ODMAH Srbija ne sme više da gubi vreme, mora da postane digitalno središte Balkana," Blic.rs, accessed July 10, 2022, https://www.blic.rs/biznis/vesti/revolucija-i-to-odmah-srbija-ne-sme-vise-da-gubi-vreme-mora-da-postane-digitalno/r39cl3q.
[13] S. Lakić Govoruša N., "Popović na Kopaonik biznis forumu: 'IT sektor je najzdraviji sektor srpske privrede, jedino on poslednjih 12 godina beleži RAST,'" Blic.rs, accessed August 4, 2022, https://www.blic.rs/biznis/vesti/kopaonik-biznis-forum-2019-popovic/6ql04hc.
[14] Blic Biznis, "INTERVJU Nebojša Đurđević: 'Za biznis je dovoljna DOBRA IDEJA i nekoliko računara,'" Blic.rs, accessed July 10, 2022, https://www.blic.rs/biznis/strategija/intervju-nebojsa-djurdevic-za-biznis-je-dovoljna-dobra-ideja-i-nekoliko-racunara/wpd6kee; "Verujem da imamo šansu da stignemo, ako ne i prestignemo najrazvijenije zemlje sveta," *Inicijativa „Digitalna Srbija"* (blog), September 27, 2018, https://www.dsi.rs/verujem-da-imamo-sansu-da-stignemo-ako-ne-prestignemo-najrazvijenije-zemlje-sveta/.
[15] Blic Biznis, "INTERVJU Nebojša Đurđević: 'Za biznis je dovoljna DOBRA IDEJA i nekoliko računara,'" Blic.rs, accessed July 10, 2022, https://www.blic.rs/biznis/strategija/intervju-nebojsa-djurdevic-za-biznis-je-dovoljna-dobra-ideja-i-nekoliko-racunara/wpd6kee.
[16] "Zoja Kukić iz Startita: Plima IT sektora polako podiže brod našeg društva," *Inicijativa „Digitalna Srbija"* (blog), August 21, 2018, https://www.dsi.rs/zoja-kukic-iz-startita-plima-it-sektora-polako-podize-brod-naseg-drustva/.
[17] Blic, "BRANKO MILUTINOVIĆ ZA BLIC 'Usmerite znanje na digitalno tržište. Tamo niste ničiji rob niti jeftina radna snaga i važno je samo KOLIKO ZNATE,'" Blic.rs, accessed July 14, 2022, https://www.blic.rs/biznis/strategija/branko-milutinovic-za-blic-usmerite-znanje-na-digitalno-trziste-tamo-niste-niciji-rob/gcw1s57.

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to this view, integration into global production leads to development and broader economic spillovers.

In parallel with these optimistic views, less sanguine observers, mostly experts closely researching the sector, point to the structural limits of the Serbian IT sector and its relative marginality. Despite the growing profits, salaries, and exports, the sector is argued to have a limited development potential due to a lack of added value. The sector is primarily dominated by foreign companies outsourcing their production to Serbia, taking advantage of comparatively cheap labour, while syphoning profits abroad. Ultimately, the argument goes, the sector operates as a staffing agency that primarily pays out wages (Matijević & Šolaja, 2020, 2022).[18]

Furthermore, the country lacks successful large domestic companies that produce their own software, as well as startups that can rapidly grow, generate substantial profits, and attract large investments (Matijević & Šolaja, 2020, 2022). The Serbian start-up ecosystem is marginal even in the context of Eastern Europe, which is lagging far behind Western Europe, let alone the global tech centres of the U.S. and China. For comparison, the Serbian total start-up ecosystem is valued at around 1 billion euros, whereas the top ten ecosystems in the region are estimated to be more than 200 times that.[19] Similarly, in 2024, out of billions of euros in venture capital investments in startups in Eastern Europe and the Western Balkans, including Serbia, the region received only 14 million euros.[20] This is indicative of a rather marginal sector with little

[18] As per SITO, a research consultancy reporting on the sector since 1990s: https://www.sito.rs/koje-su-granice-rasta-domacih-it-preduzeca/ ; https://www.sito.rs/ko-najvise-profitira-na-rastu-it-izvoza-iz-srbije-razvoj-koji-moze-da-nas-unazadi/

[19] Data from, a market intelligence companay Dealroom, as reported by Vestbee: https://www.vestbee.com/blog/articles/cee-startups-are-worth-213-b-with-poland-ukraine-and-estonia-contributing-50-to-the-region-s-enterprise-value-report

[20] Data collected by Recursive: https://therecursive.com/cee-region-funding-tops-e1-15b-in-h1-2024-czech-republic-is-leading-the-way/?utm_campaign=Newsletter&utm_medium=email&_hsenc=p2ANqtz-_xCtCRlJF49D2sO1t2wz_Xv3xv6rbO67tU0KdF3tdSNNOdlka8Xt0fSV2zBK4GeIig57-7-dd23PJnDcXesRXs7yu1rOlrn5vPZLk2PQFGFvX6VLc&_hsmi=321734646&utm_content=321734646&utm_source=hs_email

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potential to lead broader economic development. This corresponds to yet another view of economic development, in which some sectors or regions are integrated into the global economy in a dependent and asymmetric way, without the ability to generate large surpluses or to facilitate economic development.

As I show in this thesis, the dynamics of the sector are far more complex than what this dichotomy suggests. Its understanding requires careful historical analysis of the sector's integration into global production networks and the differentiation of value-capture opportunities for different actors across different periods. To do this, I conceptualised three developmental phases of the sector - integration, expansion, and contraction - to understand the multifaceted, changing nature of value capture and the differential gains for various actors.

While having a pre-history several decades earlier, the Serbian IT sector emerged in the early 2000s, with the convergence of the rising demand for software developers in the US and Western European companies on the one hand and the sudden availability of low-cost, skilled labour in Serbia on the other. Such labour was created by the widespread technical education inherited from socialist Yugoslavia, as well as by the country's breakdown, leading to large-scale impoverishment and unemployment. This was the foundation for what I call the 'integration phase' of the sector. Significant global labour demand, underdevelopment of the local sector, and immense labour price differences in this phase enabled firms from Western economies to engage in labour arbitrage. This, in turn, opened up space for various intermediaries, such as individual labour brokers, outsourcing companies, and online platforms, to capture value from bringing together capital and labour. It was out of this mediation that the Serbian IT sector was born.

With time, the sector consolidated and entered the 'expansion phase', roughly in the mid-2010s. This phase was characterised by the sector's constant growth. While the sector was initially

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characterised by the proliferation of domestic outsourcing companies, it soon became dominated by multinational companies, with only a few local companies managing to scale. Although as the IT market matured and expanded, competition for labour - the key resource in the industry - intensified, shaping the value-capture dynamics in the sector. While multinationals managed to access labour and dominated exports, local companies were now striving to upgrade or specialise to stay ahead of the competition. Importantly, uneven global wages, large software budgets, and competition for labour also enabled significant value capture for workers. While cheap from the client's perspective, locally the workers became a local labour aristocracy with significantly higher wages, illuminating a significant contrast between individual success stories and the relative global peripherality of the sector.

Importantly, one of the hallmarks of the sector is its exceptional dynamism and temporality of value-capture opportunities against the backdrop of changing economic incentives - as illustrated by the third and the current phase of development, or what I call 'contraction phase', lasting from late 2022 onwards. Due to a strong local and global competition and fluctuating global demand, value-capture based on selling labour became difficult, diminishing the competitiveness of the local companies. This left some advantaged companies well-positioned to capture value, while many firms relying on simple outsourcing are threatened with perishing. Likewise, the negotiating power of most workers also diminished in this process, particularly affecting new sector entrants and students.

This illustrates how the complexity of value capture dynamics of the sector, where different actors in differing ways manage to capture value within distinct developmental phases, goes beyond dichotomous optimistic and pessimistic views outlined previously. In this thesis, I examine these value capture dynamics within the sector's development cycle in the context of the post-socialist semi-periphery. I show how different processes unfold across integration, expansion and contraction phases, primarily shaped by global labour demand and local labour

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prices, which determine the possibilities and opportunities for value capture for different actors. For this, I am primarily relying on the Global Production Networks (GPN) approach.

Conceptually, the two opposing perspectives on the IT sector described earlier roughly correspond to two large traditions in the theory of economic development. The first, optimistic view largely aligns with modernisation and liberal development approaches, which view integration into global markets as a linear progression towards prosperity. Economic development is achieved through free trade, foreign investment, and technological spillovers that allow developing economies to catch up with developed ones, provided that domestic institutions support economic efficiency (Gilpin, 2016; Rostow, 2000). In contrast, dependency and world-systems theories see this same integration as a mechanism that locks peripheral economies into low-value production and the systematic transfer of surpluses to the global core (Cardoso & Faletto, 2024; Wallerstein, 2020). In both frameworks, development is largely deterministic and monolithic, leaving little room to analyse the complex value-capture dynamics observed in the Serbian IT sector.

The Global Production Network (GPN) framework responds to these limitations by reframing development as a process of relational and uneven value capture within interconnected systems of production(Coe & Yeung, 2015; Henderson et al., 2002; H. W. Yeung & Coe, 2015b). Rather than treating integration into global production as either automatically developmental or deterministically exploitative, GPN analysis focuses on how value is created, distributed, and realised across a network of actors - lead firms, suppliers, states and workers - embedded in distinct institutional and territorial contexts. This perspective highlights that value capture is an outcome of power-laden negotiations rather than linear trajectories, and that the capacity for development depends on local actors' ability to capture and retain value.

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My thesis builds upon this approach, as I investigate where value is created and how it is captured across different mediums - such as profits, rents, salaries, and taxes - through a complex interplay of bargaining power among firms, labour, and the state. Thus, I am studying how concrete power relations within production networks across different development phases of the sector open up a space for value capture for different actors, and how these actors are actively renegotiating their positions. Importantly, I am analysing these dynamics in the semi-peripheral context,[21] which enables me to have a nuanced and contradictory position to observe global uneven development.

Most previous research has focused either on the economic core or on the periphery. While the research in the core has chiefly addressed the emergence of Big Tech and its large concentration of power and capital (Lehdonvirta, 2022; Mazzucato, 2018; Srnicek, 2017; Staab, 2024; Zuboff, 2023), other studies have examined the precarious and unpaid labour in the peripheries that enable the global tech economy to operate (Anwar & Graham, 2022; Muldoon et al., 2024; Upadhya, 2016). In this research, I am looking at a semi-periphery, a context with periphery-like constraints and core-like enablers. Such a perspective offers a novel and nuanced angle on the industry in constant flux and competition with both innovative capital-intensive companies and those with access to much cheaper labour. It enables me to raise important questions about economic development, going beyond simple accounts of growth and exploitation, conflicts and synergies, core and periphery, to show multiple determinants of value capture in outsourcing processes. Most importantly, it provides me with the toolkit to explain not only how the structural factors within global production networks shape the value capture possibilities, but also how companies and workers actively navigate structural enablers and constraints to maximise their own value capture.

[21] I will engage with the concept and explain my usage of it in the theoretical section below.

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To summarise, my goal in this thesis is to analyse the processes of value capture within software production networks, embedded across the different development phases or cycles of the Serbian IT sector development in the context of a semi-periphery. Through this approach I aim to demonstrate complex dynamics of economic development within context of service outsourcing. My focus will be on how firms and workers capture value within constantly evolving production networks, while also examining the role of the state in this process. I will do this by responding to the following guiding questions:

- How do structural conditions of semi-periphery shape value-capture possibilities of firms and workers in IT outsourcing?
- How are the local IT firms and workers navigating these structures to capture value?
- How are these value-capture patterns changing across different developmental phases of the sector?

In the following section, I will outline the main theoretical framework I employ in the study, and subsequently, explain the key research concepts, research approach, and methodology.

Theoretical framework

This work will predominantly draw on the literature on global production networks (GPN) and respond to debates within this theoretical tradition. In particular, I will engage with theoretical debates within this approach related to the value capture, uneven development, labour, and the state. These are the key topics of the following subsections.

Global production networks

The expansion of software development outsourcing and the proliferation of this sector in Serbia can be best understood through the GPN framework (Coe et al., 2008; Coe & Yeung, 2019, 2015; Henderson et al., 2002). The GPN is a key theoretical conceptualisation of economic development and globalisation. It builds upon the global value chains and global

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commodity chains approaches (Gereffi et al., 2001, 2005; Gereffi & Korzeniewicz, 1993), tracing their roots in dependency theories and world-systems analysis (Wallerstein, 2020). Although in contrast to such approaches, the GPN does not observe a totality of the global economy; it rather focuses on concrete interactions within specific production networks. As opposed to the global value chains approach, GPN does not only look at interfirm dynamics but also at complex networks including labour and states in uneven geographies of production (Bair, 2008; Coe & Yeung, 2015).

It is not a theory, but rather a heuristic tool for analysing the dynamics of global economic organisation and uneven development from a firm perspective (Coe et al., 2008; Coe & Yeung, 2015). This approach sees economic development not as a linear economic growth, but as an uneven and contested process of integrating regions and actors into global production. Development emerges through the ability of firms, workers, and states to capture and retain value from their participation in global networks, shaped by power relations and different local economic and institutional contexts (Coe, Dicken & Hess, 2008; Coe & Yeung, 2015; Henderson et al., 2002).

Production networks are primarily organised around lead firms that outsource production across geographically dispersed firms. Relations between the firms in the network depend on organisational forms in different periods, industries, and places. The main logic is to optimise production and maximise value capture at the top of the network, while pushing costs, risk, and flexibility down to suppliers, workers, and states (Newsome et al., 2017a; C. Quentin, 2024; P. Taylor et al., 2013). However, power relations in the network are much more complex. Subcontracting companies can have a preferential market position and access to resources, but also increase their power through processes of economic upgrading. This upgrading means a move towards higher-value activities, enabling higher-value capture for firms and is also assumed to have positive spillovers to workers and the broader ecosystem (Coe & Yeung,

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2019). Similarly, states and non-state institutions can regulate the operations of global production networks and also strategically capture value or facilitate economic development (Coe & Yeung, 2015). In addition, workers are also interested in improving their position in the network and actively negotiate individually or collectively (Newsome et al., 2017a; P. Taylor et al., 2013).

What drives global production networks? I view two key factors - labour demand and labour costs - as driving the production networks I am describing. They, in turn, then dictate the actions of lead firms, structuring the outsourcing landscape. These two are tied to broader drivers identified in the GPN literature, such as finance (to a large extent driving labour demand but not explaining it fully) and the cost/capability ratio (mostly tied to local labour costs) (Coe & Yeung, 2015; H. W. Yeung, 2015). In my research, labour demand refers to the general need of lead companies for software developers, while labour cost refers to the price of labour in Serbia, influencing the cost/capability ratio for lead firms seeking to outsource production. These two factors are not fully independent, as they interact; demand also shapes labour costs through supply-and-demand mechanisms.

Importantly, these factors are used to construct the IT sector development phases I already mentioned previously. Most GPN literature is primarily static, focusing on particular moments in time instead of a comprehensive historical analysis. Instead I would introduce a periodisation to explain how value capture dynamics evolve through time and why. The phases are conceptualised as following:

- Integration Phase – the combination of high demand on the one hand and cheap, skilled labour on the other leads to a boom in outsourcing. This leads not only to high profits for lead firms through the arbitrage of uneven labour prices, but also to the proliferation

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of mediators - platforms and subcontractors - that capture large value by supplying labour.

- Expansion Phase – demand remains high, while due to the maturation of the market and large competition for labour, labour costs rise. This is the period of market consolidation, driven by the influx of multinational companies, the growth of subcontracting firms, the proliferation of the workforce, and the golden period of labour due to constantly increasing salaries.

- Contraction Phase – demand falls due to factors such as over-hiring, automation, and protectionism, while labour costs remain high. This translates into stagnation and client withdrawal from the sector, leading to a contraction in the value-capture opportunities for most local firms and workers.

By focusing on different phases of outsourcing, I am able to link the development of the local outsourcing sector to the broader cycles of capitalist development. More specifically it enables me to link broader phases of expansion and correction, driven by technological change, investment flows, and changing corporate strategies to the local market changes in Serbia. Importantly, I show how these global processes are mediated locally by particularities of post-socialist semi-periphery and the active navigation of the markets by local firms and workers.

I will engage with the two key heterodox critiques of the GPN to build my theoretical approach. These include an underdeveloped analysis of value capture dynamics, particularly the lack of conceptualisation of labour, as well as limited engagement with broader uneven development. In the following two subsections I will introduce key debates on value and uneven development and position my work in this literature.

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Value capture

Value capture is the central concept of my thesis as it enables me to distinguish relations between different actors and their gains, but also to theorise about broader developmental implications of IT outsourcing. Value is the core analytical pillar of the global production network approach due to its implications for economic development. GPN literature distinguishes between three instances of value: value creation, enhancement and capture. Value creation refers to the generation of economic surplus through the application of labour, capital, technology and organisational knowledge to produce a new good or service. Value enhancement refers to making an existing product or service more valuable through different inputs, recombining existing resources, or upgrading skills and technologies. Value capture, by contrast, refers to the ability of firms or institutions to retain the surplus generated or enhanced within their own organisational and territorial boundaries. This is the most important developmental dimension of GPN, because actors may create and enhance value without retaining much of it - if other actors appropriate the surplus through asymmetrical power relationships. Thus, while a local or regional economy may be inserted into a network and firms might participate in production and generate substantial surplus, and yet lose that surplus through different mechanisms to other firms, producing uneven development (Coe & Yeung; Coe & Yeung)

Value is conceptualised in heterogeneous theoretical and epistemological terms and remains a key contention point among scholars. The original theoretical basis envisioned by scholars such as Coe, Yeung and Henderson (Coe & Yeung, 2015; Henderson et al., 2002) is dual in nature. First, the value is conceptualised as a surplus value from the production processes, resulting from the conversion of labour power into goods and services, drawing on Marxist political economy. This approach then sees value capture as a process of appropriation of value produced by labour. Second, GPN draws on the more orthodox notion of economic rent: profits

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accruing to actors that possess scarce or exclusionary advantages such as proprietary technology, organisational know-how, branding, relational capabilities, market dominance, or favourable access to resources, infrastructure, finance or policy environments. In this approach, the distinction between value creation and capture is more blurry as firm value capture is often interpreted simultaneously as value creation. Accordingly, value capture can be understood either as the capture of economic rents (above-average profits due to preferential market position) or surplus value (value extracted from labour by capital).

Critics point out that the two approaches are incomprehensible as they stem from different epistemological and theoretical assumptions (Havice & Pickles, 2019; McGrath, 2018; Werner, 2019). These approaches are also tied to distinctive research agendas. While the concept of economic rent is primarily used to empirically explain interfirm competition dynamics (Blažek, 2016; Coe & Yeung, 2015), the concept of surplus is mostly used to theoretically conceptualise the dynamics of labour exploitation and global uneven development. (Bair & Werner, 2011; Werner, 2019; Mazzucato, 2018; Quentin, 2024; Quentin & Campling, 2018). These two approaches will be briefly summarised below before I move on to explain my theoretical approach.

Economic rent is a central concept of GPN, crucial for understanding uneven value capture between firms (Coe & Yeung, 2015; Roy, 2017). In contrast to narrow, traditional understandings of rent as control over scarce assets (Christophers, 2020), rent in GPN is understood rather as the ability to earn surpluses from a preferential market position. In contrast to the Marxist notion of rent based on the monopoly of land, arising from property relations rather than productive activity itself an deducing surplus value from capitalist gains at the benefit of passive rentier, I am focusing on quasi-rents instead. Quasi-rents instead shift away from fixed property relations towards temporary excess returns generated by asset specificity, scarcity, and competitive asymmetries within the production itself.

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In this research, I primarily rely on Kaplinsky´s definition and classification of rents (Kaplinsky, 1998, 2019). In this view, firms can capture rents through privileged access and control, differential productivity factors, and barriers to entry. In essence, rentiers benefit from the absence of competition, enabling them to capture surpluses. Particularly relevant for my research are dynamic or quasi rents that cannot be completely protected from competition and are temporary in contrast to standard rents, and weaken due to competition (e.g., compared to real estate). As some companies create rents through innovative market positioning and process optimisation, other firms swarm to replicate them, thereby eroding the initial advantage (Havice & Pickles, 2019; Kaplinsky, 1998).

There are many different kinds of rents, including resource, policy, technology, human resource, organisational, relational, product, marketing, infrastructure and finance rents (Coe & Yeung, 2015; Kaplinsky, 1998, 2019). These rents have different dynamics, but they also largely overlap, making it usually difficult to distinguish them. For example, human capital rent is based on control of a scarce supply of skilled labour, while relational rents explain value extraction based on relationships with other companies or actors. One form of relational rents can be reflected in the ownership of key exclusive outsourcing contracts (Christophers, 2020). Organisational rents refer to the ability of firms to capture rents from the increasing efficiency of their production processes, achieved through the efficient management of production inputs, particularly labour. Firms can also accrue product and marketing rents, based on product differentiation in the market, including intellectual property ownership (Christophers, 2020). Finally, firms can gain rents through access to or control of infrastructures, both physical and increasingly important digital infrastructures (Srnicek, 2021). Companies can also capture rent through various policies, including preferential tax treatment.

It is particularly important to consider these rents in the context of global competition, as rent capture by some also means the loss for others. Thus, firms compete to upgrade and appropriate

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whatever categories of rent are within their grasp, aiming to do so faster than others (Kaplinsky, 1998). While the possession of strategic assets like IP allows core firms to be relatively insulated from competition, peripheral firms with more transient forms of rent, primarily based on access to cheap labour, bear the burden of competition, thereby endangering their profitability (Gereffi & Korzeniewicz, 1993; Havice & Pickles, 2019). It is essential to consider that most core firms are located in core economies, while firms lower in the network tend to concentrate in economic peripheries, with competition around them reproducing global economic inequalities (Roy, 2017).

This approach has been criticised for its limited conceptual and political implications. As McGrath (2017) argues, mainstream GPN treats rents as if they were straightforward forms of value creation – whenever firms manage to appropriate value beyond normal profits, this is simultaneously seen as value creation. This becomes especially problematic when favourable policies, infrastructure or finance that enable firms to profit are described as value-generating, rather than pure value transfer from public to companies. Likewise, Quentin and Campling (2018) argue that this approach obscures both where value actually comes from and where it goes, a crucial precondition for understanding the dynamics of uneven development.

The second conceptualisation of value is surplus value. As per original GPN conceptions of value, in parallel with economic rents, labour can also be seen as the ultimate source of all value (Coe & Yeung, 2015; Henderson et al., 2002). This is ultimately a Marxist perspective on labour value, in which the value is “created by the living labour of workers in the economy as a whole" (Starosta, 2010). While this approach is not the mainstream in the GPN literature, some authors do follow it, seeing production networks primarily as embodied systems of labour, with labour at the heart of all production (Rainnie et al., 2011; Riisgaard & Hammer, 2011). Ultimately, this perspective sees all value as created by labour, with surplus value then captured by companies, with price, profit, interest, and rents simply being different

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interconnected moments of the morphing of value in different spheres, analysed separately in empirical enquiry (Havice & Pickles, 2019; Roy, 2017). These conceptions then focus on the centrality of exploitation and uneven development in value-capture processes (Havice & Pickles, 2019).

Within this approach, two interconnected sources of value could be identified: uneven global labour prices and the extraction of value within the labour process. Firstly, the value of labour is not fixed when viewed through the prism of wages across countries or over time. This is so because wages follow costs of subsistence and reproduction, which vary considerably depending on historical, cultural, economic, and political conditions. Thus, instead of a single value of labour power in the globalised world, labour is recompensed at different rates (Amin, 2014). Then, with globalisation, there is increased mobility of capital, with a relative immobility of labour, allowing for differential rates of exploitation of labour and extraction of surplus value (McGrath, 2018). Peripheral economies provide services and commodities embodying a greater amount of labour, while core economies keep higher-value-added activities, ultimately accruing these surpluses through rents (Roy, 2017). Thus, as per Amin, there is a systematic global redistribution of this surplus through mechanisms such as unequal exchange and rents, transferring part of the value produced by the labour in the periphery to the core, reinforcing global hierarchies and underdevelopment (Amin, 2014).

Secondly, surplus value is primarily extracted in the labour process (Roy, 2017). This is why some authors in GPN literature call for the incorporation of the analysis of the workplace processes into the theorisation of global production to better understand how value is created, captured, and distributed in the networks (Newsome et al., 2017a; P. Taylor et al., 2013). Labour process theory (Gandini, 2019; Thompson, 1990, 2010) analyses mechanisms through which surplus is extracted from workers through managerial techniques of labour intensification and optimisation. The extraction of surplus value through labour control and

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management also becomes a key competitive advantage between firms. The labour process theory maintains a commitment to understanding the labour process as a key site of political and economic antagonism, as workers actively try to resist or rework their position within it.

While this surplus value approach provides a powerful conceptual apparatus for understanding labour and capital relations, as well as broader uneven development, it suffers from two key downsides. Firstly, it relies on a widely criticised labour theory of value, making strong assumptions about value creation that do not always capture the complex empirical reality. Secondly, it lacks nuance in explaining complex value capture dynamics and interfirm competition that the concept of economic rent possesses (Havice & Pickles, 2019).

These two approaches outline key theoretical conflicts around explaining value and value capture. However, before moving on to outline my conceptual approach it is necessary to acknowledge not only value capture from the angle of the companies described previously, but also to introduce the perspective of other key actors - workers and the state. Without accounting for these actors, it is no possible to theorise economic development implications of value capture dynamics.

Firstly, the struggle to capture value by workers has been neglected in the GPN literature, where workers are often portrayed as passive recipients of capital's global mobility and restructuring strategies (Coe & Jordhus-Lier, 2011). However, there are growing calls to view labour as a social actor actively shaping the organisational, spatial, and political structures of production networks (Riisgaard & Hammer, 2011). Challenging this depiction, labour geographers (Herod, 1997, 2001) have long argued for a fundamental reconceptualisation of labour, not merely as a factor of production, but as a sentient and spatially embedded actor capable of shaping capitalist geographies. This framework emphasises that workers engage in intentional and unintentional practices that influence the economic landscape, striving for their own 'spatial fixes' and

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capturing value much like capital. They do this through collective resistance but also in everyday practices, such as negotiating, changing work, or resisting rigid labour discipline, that reshape production from within (Coe & Jordhus-Lier, 2011; Katz, 2004). Thus, labour and capital strategies exist in a dialectical relationship, each shaping the contours of production and the conditions of labour (Cumbers et al., 2008), making the labour process a field of struggle (Bair & Werner, 2011; Selwyn, 2014).

As for the conceptualisation of the state in GPN, it can play several roles, including facilitator, regulator, producer, and buyer (Horner, 2017). The value capture from the perspective of states has mostly been studies through the concept of strategic coupling, or the ways in which states align local institutions and resources with the needs of global production networks or particular lead firms' processes (Coe & Yeung, 2015; Coe et al., 2008; MacKinnon, 2012). The goal is to embed such firms locally and facilitate economic development or to produce value for the lead firms in GPNs, while also ensuring value capture and spillovers locally (Coe et al., 2008; MacKinnon, 2012). In other words, the state enables capital accumulation for multinational firms with the ultimate goal of better positioning of domestic capital and workers (Horner, 2020; Werner, 2019). However, as it will be show in the section on uneven development and semi-periphery below, such perspective is limiting in observing the actual value capture dynamics due to lack of power and strategy of states in directing economic processes. In turn it is useful to look at the state from the perspective of value capture and circulation of value – both sypthoning away of publicly created value and ability of states to generate taxes (Quentin & Campling, 2018).

My approach to conceptualising value capture will build upon these debates around heterogenous concepts of value in GPN. I adopt a hybrid approach taking advantage of distinct strengths of the two approaches outlined above – surplus value and economic rents, but also incorporating perspectives of both labour and state. While coming from diverging intellectual

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traditions, I consider both approaches to value relevant for understanding different forms of value capture within global production networks as they indicate complementary mechanisms: the notion of economic rent focuses on interfirm relations, while the notion of surplus tackles labour capital relations and uneven global exchange. Instead of seeking a clear definition and exact measure of value, I bring together different notions of value capture in a dynamic framework. I align with the authors who emphasise the importance of complex struggles over how value is constituted and captured in a particular context (Taylor, 2008; Werner, 2019). In other words, I will outline the processes through which value is created, captured, and struggled over, focusing on value in action, looking at it from perspectives of firms, labour and the state. I adopt this approach as it enables me to illuminate complex value-capture mechanisms in the IT sector that cannot be comprehended through a single perspective, but also because exact measures of value capture are not available. In principle, when describing interfirm competition I will focus primarily on the conception on rents, but when describing relations between labour and capital and broader global uneven development I will focus on surpluses. Through this approach, I also aim to show how both theoretical traditions are valuable for describing the complexity of value capture, rather than limiting it to a single definition.

Instead of quantifying value capture, I sociologically examine different relations and mechanisms that enable these forms of value capture through a relational perspective (H. W. Yeung, 2005). Through this, I attempt to respond to questions such as who holds structural advantages and how, what mechanisms enable or hinder value capture, whose position is reinforced or undermined, and how these processes are contested or reproduced over time. Thus, rather than treating value as a fixed category, I would focus on the ways value capture is enacted, contested, and negotiated. At the same time, I acknowledge the main downsides of this hybrid approach, primarily not developing a consistent, coherent conceptualisation of value capture. My approach to value capture is summarised in the value framework presented below

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where I show distinctions between value creation, value capture mechanisms and distributional outcomes and describe my definitions of those.

I adopt a heterodox understanding of value creation and enhancement in line with GPN tradition – while I acknowledge the central role of labour in value creation, particularly in the labour-intensive software industry, I also see value creation supported by firms and the state. As it will be shown throughout the thesis, particularly in Chapters 2,3 and 4, the firms play a crucial role in value creation and enhancement through reduction of transaction costs, organisation and innovation – activities that cannot be boiled down to labour. For example, digital platforms and outsourcing firms created a software development market in Serbia in the first place, enabling value capture not only for themselves and client firms, but also for local workers and the state. Through mediation these firms reduce transaction costs and through labour process they optimise production in such a way that they ultimately could be said to create value. In the same manner, the generation of innovation and economic upgrading can also be seen through the lens of value generation and enhancement. Finally, I see state policies, primarily tied to education, as indirectly value-generating as they produce skilled labour, the essential resource in this sector. While I adopt this hybrid notion of value creation to adapt to the empirical reality of my research field, I do not engage in further theorisation of value creation that is beyond the scope of this thesis, as it is one of the key unresolved debates in literature. However, I do demonstrate empirically why this hybrid approach is useful, as it captures empirical reality more fully than either focusing on surplus value or rents.

I see value capture as divided into two different components: value capture mechanisms and distributional outcomes. Value capture mechanisms are relational processes through which actors appropriate and retain higher shares of created value. In the classical political economy literature, value capture constitutes appropriation of surpluses above normal profits, as a function of governance or power mechanisms enabling disproportionate appropriation. While

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I do not have quantitative data to support such conceptualisations in my research, I treat value capture more liberally, as mechanisms enabling higher value capture vis a vis other actors, creating structural advantages within production networks. I see distributional outcomes on the other hand are forms in which value appropriation takes as – varying for different actors.

From the firm perspective, I explain value capture both through the notion of economic rents – particular advantages firms leverage to appropriate more value (such as access to labour, clients, IP, etc…), as well as surplus value extraction from the labour process and uneven global labour prices. While in the first case I focus on particular advantages firms might have against other firms in the production network, in the second approach I look at how firms capture value vis-à-vis advantages over labour. The distributional outcomes for firms should be understood in the form of profits. However, value capture should not be conflated with profits – it is only a proportion of profits which results from particular structural advantages firms might have vis-à-vis other firms, not a regular organisational margin.

From the workers' perspective, I analyse their strategies in appropriating higher shares of surplus value in the form of individual market mobility strategies, but also organised labour struggles. When it comes to distributional outcomes, I look at how workers achieve higher salaries and also improved working conditions. As explained in Chapter 5, I will introduce the notion of social upgrading from GPN as a form of thinking about labour gains, either through top-down spillovers or pressures from organised labour or other institutions. However, I will argue how in my case these gains can be rather seen through individual strategies of workers to capture value, acting more akin to firms than to organised labour also operating through institution as understood among scholars theorising social upgrading.

When it comes to the state perspective, I see the state as more indirectly involved in value capture processes. While having a significant role in value creation, primarily through support

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for public education and different forms of stimulation of economic activities, the state is also capturing value indirectly through taxation and broader economic spillovers. The role of the state is mostly theorised in Chapter 4.

Ultimately, the focus of my thesis is on this intermediary layer of value capture mechanisms, although I do talk about value creation and distributional outcomes as well, but primarily in the service of explaining value capture. The reason for this is that value capture mechanisms enable me to understand the dynamics of the production network and ultimately the developmental outcomes I am interested in. I view value capture through a processual lens, a mechanism, rather than a quantitative proof of how much value is ultimately captured. However, while such a distinction in value creation and capture is conceptually useful, I do not treat these processes as fully separate. Importantly, value is not fully formed prior to capture, but is constituted through processes of capture itself. For example, the intermediation I analyse not only serves to capture value, but also to create it, as production would not occur at all without it, but also because it increases the amount of value for both firms and workers to capture through bridging geographic distances and reducing transaction costs. The same goes for the labour process - while labour process practices serve for the purpose of extraction of surplus value from the workers, they are also designed to increase the overall value through productivity gains due to skill development or improved organisation of production processes. Thus, value is simultaneously produced and extracted in the processes I describe.

Uneven development and semi-periphery

While useful for operationalising concrete value-capture dynamics in production networks, GPN theory has been criticised for failing to explain broader uneven development dynamics. On the one hand, GPN scholars have been focusing extensively on horizontal network dynamics, without seriously engaging with broader macro processes of uneven development. In other words, while distancing themselves from world-system scholarship, they sidelined the

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notion of global uneven exchange and broader political economy, while focusing on mezzo-level concepts (Bair & Werner, 2011; Werner, 2019). Thus, they do not analyse the macro-dependency relations between what dependency theorists call the core and periphery regions, where value is systematically syphoned from the latter to the former (Amin, 2014).

This approach has also been criticised for its inclusionary bias, or its focus on the integration of regions into GPNs, which are preconditions for economic development, while neglecting processes of exclusion. As Bair and Werner (2011) and Werner (2019) argue, participation in GPNs does not guarantee general development, but it produces a landscape in which regions are dynamically included and excluded from the production networks. Their argument is that the same way networks are articulated, they can be disarticulated through dynamics of devaluation and disinvestment. As firms relocate, downsize or restructure production, they leave some places locked into low-value activities or completely excluded from capitalist flows.

This links to Smith's theory of uneven development, processes of articulation and disarticulation within GPNs reflect capital's inherent tendency to develop and underdevelop space simultaneously. As some regions are drawn into global circuits of value, others are marginalised or abandoned, producing geographically differentiated patterns of accumulation that are structurally necessary to capitalism's reproduction (Smith, 2008). This can also be seen as a part of broader treadmill dynamics of capitalism, of constant competition and search for new sources of profits through reorganisation and innovation (Postone, 1993). While utilising GPN concepts, I will rely on these insights throughout the thesis.

But how to localise the uneven development dynamics and account for the particular position of the Serbian economy and IT sector, and its implications for development? This is a weak point of GPN, as it departed from world-systems theories to focus on empirically grounded

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analyses of particular networks and value chains (Bair & Werner, 2011; Werner, 2019). Still, the world-system approach can be a useful angle to understand the functioning of production networks. These theories understood the global economy as a single, interdependent system with a core, periphery, and semi-periphery performing different economic functions, the main feature of which is the transfer of economic surpluses from the periphery to the core. This happens through the division of labour, in which core economies perform high-value functions while low-value functions are delegated to the periphery, enabling the flow of surpluses through unequal exchange (Wallerstein, 2020). As per Arrighi (1994), semi-peripheral economies combine elements of economic advancement, such as industrial development, regional hegemony, and partial control over capital flow, with continued dependence on foreign investment, unequal exchange, and labour-intensive production, thereby allowing them to mediate between the core and periphery while pursuing upward mobility and system stability.

This approach has been criticised extensively as teleological and deterministic, unable to explain historical change, as well as the processes of economic development and value capture avenues, which I am studying (Sewell, 1996; Skocpol, 1977). However, the framework proposed by this theory could still be relevant for placing the global production networks within broader global economic asymmetries. Accordingly, I will use a more dynamic notion of semi-periphery (Avlijaš & Gartzou-Katsouyanni, 2024, 2025) to capture a broad range of characteristics of the sector I am studying in relation to its position in the global economy. Semi-periphery denotes economies or sectors that encompass constraints typical of both the periphery and the core. That means that alongside features such as dependence on foreign capital, weak state capacity, dependence on transnational corporations, and institutional and economic fragmentation, they also have a relatively stable macro-settings, better infrastructure, skills, and access to higher value export markets (Avlijaš & Gartzou-Katsouyanni, 2024). This approach helps me understand the limits of value-capture opportunities for local workers and

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companies, driven by dynamics outside narrowly understood production networks, as well as the broader set of enabling conditions these actors rely on.

Post-socialist Eastern European economies, including Serbia, exhibit many characteristics of such semi-peripherality, although this depends on the sectors. In the context of IT sector, such semi-peripheries have an advantage over peripheral regions in inheriting infrastructures and educational systems that are crucial for skill development. On top of that, they have physical, cultural, and linguistic proximity to core economies in Western Europe and the US which enable smoother integration into production networks. However, these economies are usually reliant on FDI for growth, have weak administrative capacities and are plagued by clientelist networks. Furthermore, they are mostly asymmetrically inserted into GPN where they are delegated lower value tasks and have high-tech/high wage niches co-existing with low-tech cheap labour sectors (Avlijaš & Gartzou-Katsouyanni, 2024; Bohle & Greskovits, 2012; Medve-Bálint, 2024; Nölke & Vliegenthart, 2009; Pavlínek et al., 2009).

One component of semi-peripherality that is particularly salient in my case is the persistence of the middle-income trap (MIT), which explains why countries or sectors that have achieved sustained growth struggle to transition into higher-value-added economic activities. As per MIT, growth slowdowns occur when the easy gains from cheap labour and technology imitation are exhausted, yet new sources of growth rooted in innovation and knowledge-based activities fail to emerge. At this stage, semi-peripheral economies or sectors are squeezed between low-income countries that retain cost advantages in labour-intensive production and high-income economies that dominate technology- and capital-intensive industries (Agénor, 2017). Constraints on the development of semi-peripheral sectors and economies are not just economic but also institutional and political. Doner and Schneider (2016) emphasise that inequality, informality, reliance on FDI, and weak state capacity are common in semi-peripheral economies, fragmenting societies and preventing the formation of “upgrading

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coalitions" capable of building the institutions required for innovation, skills development, and contract enforcement. Clientelism and elite capture divert resources away from longer-term upgrading toward short-term distributive politics. Ultimately, local development is hindered by both external value capture and internal blockages, as the value created in semi-peripheries is often captured by multinational corporations or domestic elites rather than reinvested in development (Anastasi, 2023).

In my research, I will use this concept to explain the constraints the local sector is facing, but not in a static and deterministic way. Instead, due to the dynamic nature of global production networks, the position of firms and regions can change depending on broader network dynamics and on the agency of different actors. In other words, the global production network approach also leaves space for increased value capture for some actors and development, overcoming constraints of the middle-income trap (Bril-Mascarenhas et al., 2025; Naseemullah, 2022).

Thus, in this thesis, I will use both notions of the semi-periphery and the middle-income trap, and a more dynamic notion of GPN and uneven development to understand how their interplay shapes value capture dynamics in the Serbian IT sector. Ultimately, with the concept of semi-periphery, I will not invoke the complete epistemology of world-system analysis but rather use the concept of semi-periphery flexibly to explain the broader structures in which production networks are embedded.

Tightly related to these notions of uneven development and semi-periphery is also the role of the state in production networks. The state's ability to guide development and capture value depends on two factors - the position of the economy within production networks and, more generally, unevenly developed geographies, as well as the state's political-economic model and developmental capacities. Firstly, the state's ability to guide development depends on the

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strength of the local economy and the balance of power vis-à-vis foreign capital depending on mobility of capital and the specificity of regional assets such as resources, institutions, infrastructure, skills, or networks (Coe & Hess, 2010; Coe & Yeung, 2015; Horner, 2020). However, as it has been shown, capital in the sector is highly footloose and has considerable location choice. In such cases, the provision of cheap labour usually becomes a principal way of attracting and retaining global capital (Coe & Hess, 2010; McGrath, 2018; Noronha & D'Cruz, 2020). From the GPN perspective, this can be characterised through the concept of dependent or subordinate coupling, where multinational companies have asymmetrical power over local firms and labour, with limited local value capture opportunities (Coe & Yeung, 2015; MacKinnon, 2012). In such cases, state policies are often geared towards labour arbitrage and uneven value capture (Coe & Hess, 2010).

In addition to structural economic factors, it is important to consider political factors. Unlike East Asian economies that have often been praised as success stories (H. W.-C. Yeung, 2010) with their particular position in directing capital through efficient bureaucracies, most states do not have similar capacities or agendas. Most semi-peripheral states, including Serbia, have adopted a neo-liberal approach to capitalist transition without a developmentalist agenda, mostly responding to the interests of capital, while having weak capacities to build institutions and lacking knowledge and resources to be strategically inserted in the global economy (Coe et al., 2008). Such countries are often mired with conflicting political interests in the country and characterised by state capture and clientelism, and not a developmentalist state agenda (Doner & Schneider, 2016), as it has also been demonstrated in the case of Serbia (Avlijaš et al., 2023; Mikuš, 2018; Upchurch & Marinković, 2011). In light of this, most of what can be considered economic upgrading and development is based on the inflow of foreign capital, as well as on complex and messy value-capture trajectories of individual firms (Avlijaš et al., 2023; Avlijaš & Gartzou-Katsouyanni, 2024).

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Taking together the context of the dependence on foreign capital in economic development, but also the semi-peripheral and post-socialist context of Serbia, I view the state in this thesis through a dual lens. On the one hand, I see the state as the enabler of the sector's growth and value creation due to both policies oriented towards attracting foreign capital and absorbing the costs of outsourcing. In addition to that, I am looking into the socialist legacy that created conditions for the emergence of the sector, primarily widespread technical education and research. On the other hand, due to a weak structural position and the lack of capacities, I also see the state as unable to guide development in the form of economic upgrading and move the sector towards higher-value activities, thus also limiting value capture prospects either through taxes or broader economic spillovers. This is the central tension through which I will analyse the role of the state in the rest of the thesis.

Research approach and methodology

Research approach

The methodological approach I am taking in my research is based on the unique characteristics of the software development sector and the outsourcing of services. Software as a final product within large software companies is only a fraction of what we understand by IT. As software is an essential component of businesses across sectors, it acts as a support function for virtually all kinds of services or manufactured products. Consequently, millions of companies either have their own IT departments or outsource their IT functions as non-core competencies (Kleibert, 2016). Furthermore, there are millions of smaller start-up companies developing their own software products, as well as smaller enterprises and individual independent contractors undertaking outsourcing work. Importantly, all of these companies do not converge in a few major production networks led by multinational corporations, unlike in sectors like automotive, but participate in numerous different production networks with exceptionally

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complex firm interrelationships (Yost, 2017). This is also the case with the Serbian IT sector, consisting of tens of thousands of companies and freelancers providing services to numerous client firms.

Furthermore, it is difficult to trace software movement. By nature, software lacks materiality, and it is difficult to track it the same way as physical goods. Most of the software industry is enterprise-focused, meaning software primarily flows through business-to-business interactions and is less visible to the broader public. Furthermore, companies, including corporations, SMEs, and startups, as well as public agencies and non-profits, rarely disclose their software outsourcing practices (Yost, 2017). Finally, branches of IT companies in Serbia only show labour costs in their export figures, not the full value of the services they charge to their clients. Due to all the above-listed reasons, software development, as a service in general, has been understudied in the economic geography literature, despite frequent calls for its study (Kleibert, 2016).

Therefore, my empirical research moves beyond traditional GPN approaches, involving primarily manufacturing industries, where authors would usually study a production network of large lead multinational firms. Instead, I am focusing on value capture trajectories in different outsourcing arrangements through three developmental phases of the sector, focusing on actors such as labour, subcontracting firms, and online platforms. As argued, I use value capture as a relational and processual phenomenon rooted in asymmetrical power relations within global production networks. This contrasts with the quantitative outcome derived from marginal productivity and the assumption that incomes fairly reflect value, as conceptualised in the neoclassical economy. I conceptualise rents, wages, profits, taxes, and other forms of value circulation as outcomes of actors' relative positioning in production networks and bargaining power. Value capture, therefore, occurs when actors appropriate a share of the value produced across networks through preferential market positioning. In this sense, I treat value

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capture not as an exact measure but as a mechanism of appropriation based on relative power in production networks. In other words, instead of quantifying value, I am tracing processes and mechanisms.

While the thesis primarily focuses on the firms and workers, it also analyses the role of the state in value-capture processes, but rather as a background actor. The state is crucial to enabling the emergence and proliferation of IT outsourcing in Serbia by providing education and absorbing costs, primarily through the tax system. However, its role in supporting companies in moving towards higher-value-added activities is much more limited. No single chapter focuses exclusively on the state, but its role is rather interwoven through the narrative to reflect its changing role.

My research is not bound to a single place. Due to the comparatively small size of the sector and its high degree of integration, the Serbian IT sector is often considered a single ecosystem, with its core located in the most significant cities - Belgrade and Novi Sad. Furthermore, many outsourcing companies have branches in various cities in Serbia, and their workers are scattered throughout the country, particularly among remote workers and freelancers. Furthermore, there are no notable differences between companies in different cities that would influence the general trajectory of value capture dynamics I am explaining. Because of this, the research is also not limited to a specific place but rather encompasses the country level. Still, a large portion of my insights is tied to Novi Sad, the second-largest city in Serbia, where the IT industry largely emerged and plays a disproportionately significant role.

In this research, I bring together inputs from a large number of companies, workers, and experts, as well as secondary data and available quantitative data. However, to build a narrative on value-capture dynamics and illustrate changes throughout different phases in the thesis I focus in particular on two case studies. When it comes to methods, I am applying a multimethod

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approach, relying on both qualitative and quantitative data, including interviews, digital and traditional ethnography, and quantitative data obtained from online platforms, job portals and national statistical databases. Most of the data was collected from 2021 to 2023; however, I continued to collect data throughout 2024 and 2025 as well . In the following subsections, I will explain how I approached these different methods, case study selection and how I used empirical materials in the thesis.

As previously mentioned, the empirical research findings in the thesis are presented primarily through two major cases – Zvezda, representing Serbian subcontracting firms and Upwork, representing online labour platforms. I use these representative cases to illustrate how particular value capture mechanisms play out in practice through an in-depth account, and also to demonstrate how the complexity of the field I am studying plays out in particular cases. While I organised my empirical findings around the analysis of these case studies, the analysis was supported by additional material from interviews, ethnography, and quantitative data, not tied to the cases, as explained in the next subsection.

Zvezda (not a real name) is currently one of the largest IT firms in Serbia with over 1000 workers and among the oldest ones, tracing its beginning to 2008. While I analysed a larger number of firms, Zvezda was selected as the most optimal case for demonstrating value capture dynamics revolving around IT subcontracting companies. There are several reasons for this. Firstly, Zvezda is representative of key business models I encountered in the sector. It first started as a small subcontracting firm working through a range of intermediaries for clients. It then evolved into a large subcontracting firm providing a broad range of services, upgrading to higher-value activities. Furthermore, it also engaged in the founding of startups and its own digital products. Based on evidence from other firms, Zvezdas practices and business model are deemed representative of the broader sector. While I do not have evidence that the firm is representative in statistical sense, I treat it as a theoretically strategic case that illuminates value

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capture mechanisms in the sector I focus on. The second reason why this case study is relevant is also its sheer size and the influence it has on the local labour market. Its successful business model was also an inspiration to a large number of smaller companies, some of which founded by former Zvezda workers. Finally, the case was selected due to availability of empirical materials – including not only interviews with CEO and workers, but also large number of public interviews and a book about the company development written by the CEO. The case of Zvezda is elaborated in detail in Chapters 3 and 4.

Upwork was chosen as a case study to analyse online labour platforms in Chapter 2. The rationale behind selecting Upwork was that it is the largest and most impactful platform of that type on the market. This is also the platform that interviewees used the most. While there is some variation in online labour platforms, most of general-purpose platforms function in relatively similar manner to Upwork. The exception are highly specialised platforms like TopTal that include only most successful freelancers to work for corporate clients for high fees. However, such cases are more rare and not representative of the sector.

Data collection

Qualitative data

The main portion of my data collection efforts includes interviews. In total, I conducted 73 interviews with IT workers, company representatives, experts and representatives of workers and firm associations. These interviews represent the largest portion of the empirical materials I collected and are used throughout the thesis to illustrate the main arguments I am presenting. Throughout the thesis, I introduce these interview quotations to illustrate broader findings coming from multiple sources, or in cases where such interviews add some novel perspectives or are tied to specific points.

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The largest number of interviews was conducted with workers, in total 44. In the sampling process, I aimed to cover a wide range of worker profiles to gain a sample representative of the broader sector. I balanced workers by seniority and the type of work arrangement. As for seniority balance, I included a comparable number of senior workers (15), mediors (20) and juniors (9). I included fewer junior workers due to saturation, as most interviews I conducted point to similar trajectories and perspectives, while seniors and mediors had more diverging inputs. The seniority of workers has a key impact on value capture opportunities and forms in different stages of sectoral development, as it will be shown throughout the thesis, with prospects of junior workers being particularly sensitive to market expansion and contraction dynamics (Chapters 5 and 6 in particular). Secondly, I balanced out work arrangements or practically their model of engagement – outsourcing firms, multinationals, platform work or independent freelancing. This distinction is crucial as it largely determines the value capture dynamics, as I demonstrate in Chapter 2 on platform work, Chapter 3 on outsourcing firms, and Chapter 5 on worker value capture trajectories. The sample was not balanced according to gender due to the nature of the software development roles, where the majority of workers are male, although I included several female workers, reflecting the generally asymmetric gender distribution in the sector. In particular, I focused on obtaining insights from workers in Zvezda, my principal case study company, but also on the platform Upwork. Out of the total number of interviewees, 28 workers had experience in subcontracting firms, 10 with platform freelancing, 18 with freelancing outside of platforms, 9 in start-ups, 9 transformed into entrepreneurs, 7 worked in multinationals, and 4 were students with minimal work experience.

Crucially, most of the workers I spoke to, particularly senior workers, changed a large number of workplaces and types of work arrangements. Therefore, while interviewing 44 persons, I draw on a much larger sample of overlapping individual experiences. For example, 20 workers had two or more distinct modes of engagement, such as subcontracting firms, platforms,

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startups, entrepreneurship, freelancing outside of platforms, etc, with some workers engaging in all of these types of work.

When it comes to the number of interviews, I was guided primarily by the saturation principle – I did not have a fixed target of interviews, but rather spoke to different profiles of workers until the responses became repetitive, and I felt I had exhausted the potential inputs. Due to the relative uniformity of platform and company practices, I have reached this saturation point with workers after a limited number of interviews.

As for the companies, I have followed the same selection process, based on diversity of company profiles – I reached out to larger and smaller outsourcing firms, multinational branches and start-ups. However, I managed to conduct a lower number of in-depth interviews with companies due to general reluctance to share business details, but also due to the unavailability of owners and CEOs. While conducting 11 in-depth interviews with firm representatives, I also obtained written responses to questions from 6 others, although these responses were much shorter and less insightful. These insights were supplemented by digital ethnography and desk research, since a sizeable portion of data on companies is available online, as explained in the desk research explanation below.

As for the experts, I chose key academic, policy and industry experts based on existing publications, but also personal recommendations. This included expertise on tax law and its application in the sector, labour market, history of the sector and sectoral market trends. These expert interviews were crucial in validating my findings and gaining a broader overview of my field. Due to a relatively low number of prominent experts on the topic, I conducted only 10 in-depth interviews with them. On top of these, I also spoke with 8 representatives of workers and company associations, including “Digitalna Srbija”, “Srpska IT asocijacija”, “Digitalna Zajednica” and “Ujedinjeni radnici na internetu”.

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Importantly, I conducted follow-up interviews with a portion of workers, firm representatives and experts. This was crucial as the field was rapidly changing, following global booms and busts in the tech industry, reflecting on the functioning of firms and experiences of workers. With several key informants, I conducted several follow-up interviews.

The sampling process was done mainly through social media and focal contacts. Firstly, I have reached out to key social media channels for IT workers, including different professional FB groups, Slack and Discord channels, but also to groups organised for purposes of organisation and protests tied to taxation regime (More on this in Chapter 5). Second method was reaching out to workers through focal points including key worker associations, industry associations, entrepreneurs or personal contacts. After initial interviews I was also asking for further recommendations based on the profiles of workers I was interested in, effectively finding participants largely through snowballing technique. For companies, I firstly aimed to reach to the largest and most influential firms, but then I was also reaching out through social media and personal contacts also to smaller companies.

The company names throughout the thesis were anonymised, when I refer to primary data gathering I conducted, primarily through interviews. This is particularly the case for Zvezda, which is not the real name of the company – where I also do not link materials related to the company that could reveal its identity. However, I use real firm names when I talk about broader trends in the sector to provide historical and contextual overview.

There are several reasons for anonymisation . Primarily, I did not want to single out any companies not to interact with the company reputation, either by advertising it or criticising its practices. Similarly, with workers, I anonymised their names to protect their identity but also to prevent them from experiencing negative repercussions in case they provided inputs critical

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of companies. Both firms and companies were anonymised systematically using the same coding scheme across the thesis.

In addition to the interviews, the thesis also draws on ethnographic research approach. Through etnography I aimed to capture everyday lives and interactions of workers that would otherwise be difficult to account for solely through interviews. I relied on two types of ethnographic insights – ethnography of co-working space and virtual ethnography. Firstly, I conducted fieldwork in a coworking space in Belgrade in the summer of 2022 for two months. The rationale for choosing a co-working space was the lack of access to firms, but also the difficulty in finding remote workers for interviewing. Several IT firms had offices in this working space, which would make it possible to get an ethnographic glimpse into their everyday work and obtain contacts. While I interacted with several software developers in a working space over a course of 2 months and gained significant insights into daily dynamics of remote work, such insights were limited. This is because a relatively small number of freelancers and firm workers used these spaces at all, as most of them worked from home. This was particularly pronounced due to the peak of Covid pandemic when I conducted my research. The second reason was that ethnographic insights were relatively limited, and regular interviews appeared to be much more relevant for my research questions.

The second ethnographic approach I employed was a virtual ethnography of online IT communities on Facebook, Slack, and Discord, as well as employment portals. This was a relatively unstructured virtual ethnography conducted regularly from 2022 to 2024. The first goal of this ethnography was to gain insights into the group dynamics and political views of workers – particularly in relation to struggles around taxation initiatives (Described in Chapter 5). Following discussions in worker organisation channels provided me insights into key discussions, conflicts and strategies, helping me understand what the collective organisation of IT workers looks like. This primarily included analysis of Slack and Discord channels and

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Facebook groups of relevant worker associations. Secondly, I analysed comments on employment portals to obtain more insights about particular companies, but also the overall perception of work conditions, career trajectories and aspirations of workers. These portals (such as "Helloworld") have profiles of most IT companies operating in Serbia, where workers leave comments about their work experiences there, with some prominent companies, like Zvezda, having hundreds of comments. This also included exchanges between the CEO and former workers, providing valuable inputs in employment dynamics, supplementing interview and desk research findings.

Quantitative data

To gain insights into quantitative trends, I relied on three data sources. Firstly, I used web scraping to collect data on Serbian workers on the online labour platform Upwork. This means that I automatically collected data about workers from the platform using a web scraping algorithm technique, including their hourly wages, skills, and previous clients. I scraped 1000 profiles from Upwork in December 2023. While there are many more Serbian workers on the platform, Upwork blocks attempts at automated scraping. However, this limited sample was still sufficient to gain representative insights into worker profiles and salaries, while data on the total number of workers is already available in previous research. More details on this are presented in Chapter 2.

Further, to gain insights on the non-platform remote workers, I obtained data from a major IT job-seeking portal in Serbia – "Helloworld". Following my request, the company provided me with several years of aggregated data on vacancies and the share of remote work positions through time. While limited to one portal, it is the largest one in Serbia and captures a significant portion of the market. Furthermore, this represents the most comprehensive source of such data. Details on this data are also presented in Chapter 2.

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To gain quantitative data on companies, I relied on the raw data obtained from the National Register of Enterprises of Serbia (APR). First set of data, on the number of IT companies and the number of individual entrepreneurs, I obtained through requests as a paid dataset, in the form of aggregated data. It provides me with figures ranging from January 2010 to November 2024. The second set of data was obtained by collecting publicly available data on the APR website concerning company balance sheets. Here I extracted the number of workers, incomes and profits for the 120 largest IT companies operating in the country. This data is mostly used in Chapter 4.

Secondary sources

Throughout the thesis I base my analysis on secondary sources. Firstly, I conducted an extensive desk research, reviewing relevant scholarly articles and policy publications. However, due to a lack of peer-reviewed literature and extensive policy reports, I largely relied on other sources, including grey literature, such as newsletters, blog posts, news articles, and podcasts. In particular, I analysed data available on my key case study – Zvezda. This includes analysis of materials on the company websites, analysis of their blog posts, but also public interviews and podcasts attended by the company owner and CEO. On top of that, I largely draw on the autobiographical book by the CEO, where he explains in detail the evolution of the company.

The lack of sources is also visible when it comes to quantitative data. While I managed to obtain data from official institutions on the number and type of companies and on company balance sheets, I relied on quantitative data on sources from private companies. Official statistics rarely have disaggregated relevant data for the sector, including salaries, while several private companies either conduct their own study or systematically collect data through their portals. Furthermore, there are no official statistics or peer-reviewed research on broader

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market trends, including classification of companies, company ownership, client bases, and activities. Thus, for the overview of the market and sectoral trends, I rely largely on Vojvodina ICT cluster publications that represent the most comprehensive overviews of the sector. I acknowledge the limitations of such an approach, as a large corpus of data I rely on is produced by industrial actors, and cannot be separated from their perspectives and interests that I study in the thesis. However, in some places, I do use this data for explaining contextual trends, due to lack of better alternatives, while acknowledging the limitations of such data.

Key contributions

I aim to make five main conceptual contributions: I offer a more nuanced notion of development; re-examine the notion of value in economic geography; shed light on the complex role of labour in global production; and contribute to discussions on prospects of development in the semi-periphery, all while offering a unique empiricanl and theoretical perspective for studying the IT sector.

Firstly, instead of relying on the encompassing notions of development through integration into global markets or dependency and exploitation, I am instead illustrating it through the dynamic notion of value capture. I show how the ability of local firms and workers to capture value changes throughout different phases of sectoral development. While closely aligning with the global production network literature, I adopt critical approaches that emphasise the inherent instability and unevenness of value capture, and I also provide a detailed qualitative account of how companies and workers navigate the networks. Most importantly, I provide a historical periodasation to show how value capture dynamics are dependent on broader factors in global production networks.

Secondly, I reexamine the notion of value as used in economic geography. I dissect the concept of value and show several mechanisms through which value is created and captured, linking to

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the multifaceted understanding of value in the GPN tradition. I demonstrate that despite conceptual inconsistencies and contentions, the multifaceted notion of value does provide a comprehensive understanding of production dynamics where more one-sided concepts of value would capture only a part of the empirical reality I study.

Thirdly, I compensate for the lack of focus on labour in mainstream global production network literature. Instead of viewing labour mainly as a production input from a firm-centric perspective, I look at these networks from below, at the point of production and incorporation of workers into networks. I demonstrate concrete mechanisms in the form of labour processes and brokerage in uneven geographies that facilitate value capture from workers in the IT sector. Conversely, I am also illuminating the ways in which workers actively navigate the production networks to maximise their value capture.

Fourthly, through my approach, I am explaining the complex dynamics of outsourcing in a semi-peripheral context. I show how sectoral development and value-capture possibilities depend on the structural features of Serbia's middle-income economy and its post-socialist legacy. On the one hand, I show how this semi-peripheral position enabled the sector's proliferation through the legacy of skills, infrastructure, and proximity to core economies, also giving companies certain advantages when upgrading. On the other hand, I show how the sector faced issues typical of the middle-income trap, being stuck in competition between advanced firms from the high-income and cheap ones from low-income countries. This way, I provide insights into the possibilities of value capture and economic development in a semi-peripheral context.

Finally, I am introducing a novel perspective for studying the IT industry. As explained in the next section, most GPN scholarship focuses on industries dominated by large multinational firms, examining their governance of networks. Instead, I am adopting a bottom-up approach

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to attempt to understand decentralised, fragmented, and obscure production networks. Furthermore, I provide an account of a locally immensely relevant sector without a serious, comprehensive prior research account.

Thesis structure

The structure of the thesis is as follows: In the first chapter, I explore the emergence of the IT outsourcing sector in Serbia and the conditions that enabled its integration into the global production networks. Primarily, I show how a cheap supply of skilled labour was created in Serbia and how it converged with the rising global demand, guided by key brokerage processes. I do this by analysing the development of the Serbian IT sector from socialist Yugoslavia to its integration in global production networks in the mid-2000s. The main goal of this chapter is to explain value creation processes and set the historical foundations of the three sector development phases I analyse in subsequent chapters.

The second and third chapters describe what I label an integration phase in the Serbian IT sector, centred on simple outsourcing arrangements and the intermediation of labour. In the second chapter, I analyse the role of online labour platforms in the value capture processes. I start with online platforms, as this is the simplest form of outsourcing work to individual workers and has played a significant role in the further development of the sector. Here, I focus on the dual role of platforms as rent-capturing middlemen and catalysts. On the one hand, they capture rent from intermediation, externalise costs onto workers and the state, and extract value through an algorithmically managed labour process. However, on the other hand, they create value through intermediation and serve as catalysts for further sector integration and development. Due to their declining power to intermediate and capture rents, they open the door to cross-border remote work and the establishment of local subcontracting companies.

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In the third chapter, I analyse the value capture dynamics through the role of software development subcontracting companies, the backbone of the sector. More specifically, I analyse how subcontracting companies mediate between client firms abroad and workers in Serbia, creating value in the process, but also capturing economic rents and extracting value through the structuring of labour processes. Furthermore, I describe the instability of these rents and their erosion due to competition from multinational companies, as well as the limited prospects for value capture.

In the fourth chapter, I introduce the second phase of the Serbian IT sector: expansion, characterised by growth and market consolidation. Here, I focus on value-capture dynamics in a mature market and the opportunities to upgrade to higher-value functions within local companies. Primarily, I analyse the obstacles to upgrading for local companies and the domination of foreign multinationals, and also show how firms actively navigate structural constraints, such as the middle-income trap, to maximise their value capture.

The fifth chapter moves away from the focus on companies' value capture mechanisms and centres on workers and their prospects for value capture in the expansion phase. Here, I analyse the structural conditions that enable workers to appropriate high shares of value from their labour, as well as how they actively renegotiate their positions within production networks to capture more value from their work. Primarily, I illustrate how workers capture value through individual market mobility rather than through organised labour struggles, which most literature focuses on.

Finally, in the sixth chapter, I introduce the sector's contraction phase. Here, I discuss another transformation of the Serbian IT sector, driven by the growing unsustainability of the outsourcing model based on global price differences described in previous chapters, caused by declining global labour demand and a local increase in labour prices. I demonstrate the fleeting

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nature of outsourcing by focusing on the disarticulation of production networks, alongside the articulation described in previous chapters, but also differential effects on firms and workers depending on their market power. This way, I illuminate temporary and uneven possibilities of value capture in outsourcing.

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CHAPTER 1: FROM A STATE SOCIALIST PROJECT TO AN OUTSOURCING HUB: INTEGRATING THE SERBIAN IT SECTOR INTO GLOBAL PRODUCTION NETWORKS

To understand the value-capture dynamics of the Serbian IT sector and its integration into global production networks, it is necessary to explore its historical and geographic layering (Coe et al., 2019; Narayan, 2025). This means providing a historical perspective on global and local processes that set the conditions of possibility for its emergence and the articulation of global production networks. The purpose of this chapter is to set the foundation for understanding the development of the IT sector in Serbia by analysing its pre-history and understanding the conditions for its growth. It will explore the dynamics behind the drive for software outsourcing, its geographic expansion, and the creation of a labour force that made Serbia into an outsourcing location. This is a precondition for further analysing the evolutionary phases of the sector, comprising integration, expansion, and contraction.

In the first part of the chapter, I will explain the emergence of the global IT outsourcing industry. I will contextualise it within the global production network (GPN) approach to explain the drive to expand production networks and to incorporate cheap and skilled labour globally. I will then provide a brief historical overview of the expansion of global software development outsourcing and contextualise it in the Eastern European region, providing a foundation for analysing the IT sector in Serbia. This way, I will offer an account of how the semi-peripheral post-socialist Serbian economy provided a fertile ground for the emergence of a large outsourcing-dominated IT sector and outline the role of the state in value creation processes.

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In the second part of the chapter, I will provide a historical trajectory of the IT sector's development in Serbia, from early IT developments in Yugoslavia to its integration into global production networks in the mid-2000s. This primarily involves understanding how a cheap and skilled IT labour pool was created in the country and how the sector was transformed from a state socialist project to boost the domestic economy and military, to a supplier of labour for foreign companies. Finally, I will explain the mechanisms behind the emergence of outsourcing arrangements, with a focus on brokers, who connect supply and demand for labour in global production networks.

Ultimately, my goal is to demonstrate how the intersection of the rise of the global IT industry, semi-peripherality, and Serbia's political and economic trajectory created a key venue for the initial value capture - labour arbitrage. This means opening up the space for profiting from uneven global labour prices and physical, cultural, and linguistic proximity of semi-peripheries, which were the ultimate driver of the emergence of the Serbian IT sector. This represents a foundation for value capture through cost reduction by lead firms in the production network as well as for rent capture by various labour intermediaries, as described in the following chapters.

Conceptually, this chapter draws on the global production network approach to contextualise the emergence of the Serbian IT sector within the global IT outsourcing landscape. Furthermore, I utilise the concept of brokers to show how these networks were articulated on the ground. These concepts will be explained further in the chapter. When it comes to methodology, I will rely on the secondary literature and interviews with experts in the sector and its early pioneers. As there are no notable academic works on the history of the Serbian IT sector, a significant portion of the evidence is based on these interviews.

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Contextualising software development outsourcing

Software development outsourcing and global production networks

Why and how did the IT sector proliferate in Serbia? The short answer is that companies in the US and Western Europe needed a growing number of software developers to meet increased demand for their products and the broader drive towards digitalisation. At the same time, in Serbia, as in the rest of Eastern Europe, there was an abundance of skilled workers with high unemployment and low wages. To bridge the supply and demand, the massive outsourcing industry emerged (Baldwin, 2016). Conceptually, the expansion of software development outsourcing and the proliferation of this sector in Serbia can be best understood through the Global Production Networks (GPN) framework explained in the introduction (Coe et al., 2008; Coe & Yeung, 2019, 2015; Henderson et al., 2002).

To capture more value and achieve higher efficiency, leading firms, both software and non-software ones, undergo organisational and territorial restructuring to outsource production (Flecker & Schönauer, 2016). As in other industries, a major organisational shift occurred in the IT industry: the vertical disintegration or separation of tasks previously performed in one place and distributed across geographically dispersed supplier firms (Peck, 2017). These supplier firms were then connected with the lead firm through a value chain (Gereffi et al., 2001, 2005) or, more precisely, through a production network. Relations between the firms in the network depended on organisational forms in different periods, industries, and geographies, with the ultimate goal of optimising production and maximising value capture at the top of the network (Taylor, 2008).

Labour cost is a crucial consideration in software development outsourcing due to the labour-intensive nature of the sector (Fisher et al., 2009; Hardy & Hollinshead, 2016a; Hirschheim et al., 2009; Manning, 2013). This means that the lead companies in production networks

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effectively leverage uneven geographies to capture more value from labour by moving labour-intensive activities to low-cost locations. They are exploiting wage differences across space caused by variations in subsistence and reproduction costs of labour, which different social and economic processes have historically shaped (Roy, 2017; Wolff, 2016). Labour flexibility is another important mechanism for reducing labour costs, alongside low local wages. Firms outsource production to suppliers so that they can quickly upsize or downsize labour capacities without significantly increasing costs (Kotlarsky & Willcocks, 2009). While factors such as workforce skills, existing interpersonal relationships, and geographic and cultural proximity determine where the work will be outsourced, labour price still remains the primary factor (Dedrick et al., 2011).

Software development production networks are exceptionally complex and diverse. Both software and non-software companies outsource software development. Companies outsource either the complete software production, development and testing of particular modules, or their maintenance. However, in all cases, the primary rationale for this production network extension is to keep core activities in-house while outsourcing peripheral and, ideally, lower-value-added activities. In software companies, these higher-value-added functions include product design, R&D, marketing, sales, and intellectual property rights, which are usually kept in-house. Conversely, low-value-added, labour-intensive activities with lower complexity and higher standardisation are outsourced. These primarily include coding and software testing. However, with time, more companies are outsourcing higher-value and more complex functions. Non-software companies, such as banks or retailers, often cut costs by focusing on their core activities while outsourcing the entire software development and maintenance to suppliers.

This way, software and non-software firms create their own global production networks by becoming lead firms. These firms would then form a network of independent subcontractors or

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captive centres below them that would deliver critical inputs for the lead company (Feuerstein, 2013; Flecker & Schönauer, 2016; Hardy & Hollinshead, 2016a). A lead firm has the power to coordinate and control the operations of other firms in the network in different countries without necessarily owning them. However, the network dynamics are determined by other actors, including suppliers, labour, and the state (Coe & Yeung, 2015).

The hallmark characteristic of software development outsourcing is its exceptional geographic mobility. This means that software development work can be relocated quickly and at a low cost. The main reasons for this are the lack of need for large infrastructure investments, the high transferability of skills, and flexible organisational structuring (Flecker & Schönauer, 2016; Hollinshead, 2020). This enables software companies to quickly extend production networks and enter markets in other countries, mostly by attracting skilled, comparatively cheap software developers (Hardy & Hollinshead, 2011, 2016a).

Importantly, global production networks do not expand automatically in a top-down manner. In software development outsourcing, including in Serbia, intermediaries or brokers played a key role in this process. Conceptually, brokers occupy a mediating position between foreign companies and Serbian workers, meaning they connect two otherwise disconnected groups, enabling them to control the flow of information, resources, and opportunities (Soriano, 2021; Stovel & Shaw, 2012; Xiang, 2007). These brokers can be understood as assemblers or connective agents that bring together elements during a period of social transformation (Koster & Van Leynseele, 2018), namely the transition of the Serbian economy to capitalism and its opening to international flows.

The beginnings of software development outsourcing

The organisation of the global division of labour into core areas with higher-value-added functions and lower-value-added peripheries is a recurring pattern in capitalism (Arrighi, 1994;

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Wallerstein, 2020). However, due to breakthroughs in logistics and ICT technologies starting roughly in the 1980s, the real global coordinated production networks emerged with an unprecedented degree of outsourcing (Baldwin, 2016; Gereffi & Korzeniewicz, 1993). The first wave of mass outsourcing involved relocating manufacturing from Western economies, primarily to South and East Asia, to cut costs. This fundamentally changed the geography of advanced production, which had previously occurred exclusively in Western post-Fordist economies (Harvey, 2018; Peck, 2017; Wallerstein, 2020).

Following manufacturing, the outsourcing of services offshore experienced a significant surge in the 1990s and 2000s, leading to the delocalisation of many white-collar tasks (Flecker & Schönauer, 2016; Peck, 2017). Leading companies from high-income countries were opening branches or establishing subsidiaries in lower-income countries to cut labour costs. IT was at the forefront of this trend, both in terms of volume and in spearheading the organisational practices of outsourcing (Flecker & Schönauer, 2016). For example, in 2004, two-thirds of all offshored services were IT-related (Kotlarsky & Willcocks, 2009). Since then, the industry has experienced exponential growth. Twenty years later, in 2024, the value of the global IT outsourcing industry was estimated at around $540 billion and is projected to grow by around 10% annually.[22]

Before further explaining IT outsourcing, it is necessary to briefly outline the emergence of the software industry. Software service firms first emerged together with the computer hardware industry during the 1950s, providing custom software solutions for mainframe computers to individual customers. Software became a separate industry in 1969 with IBM's unbundling of software and hardware, due to a threat of legislative action by the state. Before that, the

[22] In this data provided by Statista, IT Outsourcing market refers to the external contracting of IT functions, services, or projects instead of relying on company-owned resources, thus excluding captive outsourcing. Available at: https://www.statista.com/outlook/tmo/it-services/it-outsourcing/worldwide#revenue

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software was either included in the machine or had to be written by the user. From that moment, hardware suppliers began charging customers separately for software products, their implementation, customisation, and upgrading, thereby putting a price on software (Cloodt et al., 2010; Narayan, 2025; Yost, 2017). This enabled independent software firms to develop and commercialise their own products, which initiated the start of the enterprise solutions – predeveloped software solutions sold to multiple corporate users. These include software for resource planning, supply chain management, call centres, inventory management, payroll, decision support, relationship management, and more. The market for these software products emerged in the mid-1970s with the arrival of the microcomputer or the personal computer and proliferated significantly in the 1980s with the rise of companies such as Microsoft. After that, the next revolution of the commercialisation of the internet gave rise to a completely new set of software (Cloodt et al., 2010; Narayan, 2025; Yost, 2017).

The rapid expansion of the IT sector in the US was the consequence of the capitalist economy reorganisation in the 1970s, and it was particularly shaped by four broad trends: automation, globalisation, public investments, and financialisation. These trends created key demand for digital technologies and, consequently, software developers (Baldwin, 2016; Schiller, 1999; Staab, 2024). Firstly, to address stagnating profits in the 1970s, U.S. companies turned to automation to cut labour costs. This significantly contributed to research and spending on new digital automation technologies. Secondly, the rapid globalisation driven by the extension of global production networks facilitated the development of IT to coordinate the extremely complex global division of labour. Thirdly, in the light of the Cold War, the U.S. invested heavily in advanced military technology to outcompete the USSR (Mazzucato, 2011). These public investments and risk-taking were key in the development of the main digital technologies, including the internet and personal computers. In parallel to these developments, the US also liberalised its telecommunications sector in the 1990s, which led to large

investments in digital infrastructure and opened the market to the entry of new IT companies, some of which would later become Big Tech oligopolies (Staab, 2024).

On top of these factors, the rise of financialisaton, or the increasing importance of financial markets compared to the real economy, was the major engine behind the rise of the IT industry (Srnicek, 2017; Staab, 2024). Already in the 1980s, venture capital focused on hard drives and PCs and later moved to software companies during the 1990s. IT was seen both as crucial to the development of key innovations in the finance industry and as an investment opportunity with outsized returns for investors. In the 1990s, investors were betting on making large profits by investing in unprofitable firms, ultimately leading to the dot.com bubble in 2000. The market was heavily built on speculative expectations, where the driving logic of the investors was to invest in firms and exit at the right time, expecting rapid and high returns on these risky investments. This laid the groundwork for the global digital economy as it facilitated the creation of key infrastructures, firms and software skills (Srnicek, 2017; Staab, 2024). Furthermore, in the 1990s, the Big Tech that we know today emerged. In this period, major Silicon Valley startups rose to prominence, giving birth to companies such as Microsoft, Google and Amazon. Crucially, the software became the key commodity that was rapidly expanding across industries. Both tech and non-tech U.S. companies were hungry for skilled professionals who would develop, implement, and maintain software (Staab, 2024).

During the 1980s and 1990s, on top of the local labour force, US companies heavily relied on high-skilled migrant workers to develop software. Companies in Silicon Valley, in particular, were getting labour through ´body shopping´. This was a practice in which foreign, primarily Indian, companies acted as subcontractors, developing software on the client's premises in the US by bringing their workers through manpower contracts (Xiang, 2007; Noronha & D´Cruz, 2016). However, apart from body shopping, the burgeoning tech sector also relied on

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immigrants from Eastern Europe after the collapse of socialism, including those from Serbia who migrated to the US during the 1990s (Biagioli & Lépinay, 2019).

Over time, in the US, the influx of foreign workers began to be replaced by outsourcing to low-cost destinations due to significant obstacles in migration policies. This was a considerably cheaper way of getting increasingly scarce labour (Manning et al., 2018; Saxenian, 2006). Although software development outsourcing had existed in the 1980s, it gained widespread popularity in the 1990s. The software development work was initially outsourced within the countries, primarily in the US, and only later turned to offshore markets (Manning et al., 2018; Peck, 2017). This is when complex global production networks expanded to incorporate labour worldwide.

By the early 1990s, companies such as Kodak, IBM, Xerox, Rolls-Royce, Lufthansa, and Deutsche Bank had already outsourced their services offshore. The work was first outsourced to countries in the Caribbean, such as Barbados, due to the low cost of labour, low taxes, English language proficiency and geographic proximity; only later was the work outsourced to India (Hirschheim et al., 2009). In the 1990s, aggressive outsourcing expansion began among technology companies such as Apple, HP, IBM, and Dell, as well as consulting and financial services companies such as Accenture, Deloitte, Citibank, and JPMorgan. India became the central outsourcing location due to its abundant, cheap labour with technical skills and English proficiency (Narayan, 2025; Upadhya, 2016). This led to the emergence of the first software outsourcing conglomerates in India, such as Infosys, Tata, and Wipro (Hirschheim et al., 2009; Manning et al., 2018; Peck, 2017). While outsourcing rapidly developed in the US and the UK, it only took off in Europe after the 2000s.

The outsourcing trend was not only a consequence of the heightened demand for software developers but also of vital technological developments (Aneesh, 2006; Flecker & Schönauer,

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2016; Freidman, 2005; Messenger & Gschwind, 2016). During this period, key developments in hardware, software, and the internet enabled the transfer of work across large distances and integrated different locations within companies' global production networks. In 1990, personal computers suddenly flooded the world, coinciding with the wide availability of the Internet. The rapid and affordable internet was enabled by a substantial investment in infrastructure, driven by the increasing influx of speculative capital into the emerging IT industry (Freidman, 2005). The installation of high-speed trans-Atlantic fibre-optic cables, along with improved telecommunications infrastructure in peripheral economies such as India, rapidly reduced the cost and increased the capacity of long-distance communication (Manning et al., 2018). Apart from hardware, the development of key software was necessary for outsourcing (Freidman, 2005). During the 1990s, a software standardisation revolution enabled interoperability among different hardware and software tools, and technological advances led to increased data storage, computing power, and videoconferencing capabilities. All of these innovations enabled large amounts of data to be processed, stored, and communicated, ultimately leading to the transferability of digital work across the localities (Freidman, 2005). Thus, technological advancements increased the ´remoteness of work´ (Messenger & Gschwind, 2016). This led to global space-time compression (Harvey, 2018) or the annihilation of the role of spatial distance, reducing the turnover time of labour and capital, and significantly reducing the costs of organising work across global production networks (Peck, 2017).

The expansion of outsourcing in Eastern Europe

While outsourcing was developing in the 1990s, it was still primarily limited to companies in Anglophone countries and a few select outsourcing destinations. However, truly global outsourcing began to emerge in the early 2000s with the expansion of software production networks. The key reason for this was an explosion in demand for software developers. Firstly, there was a massive influx of financial capital into tech companies, particularly startups,

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driving the demand for software. This was a continuation of the 1990s trend of investment in 'everything digital' that culminated in the dot-com bubble. Then, with the onset of the World Wide Web, demand for web development surged. At the same time, companies began adopting digital technologies to increase their competitiveness, leading to a massive digital transformation and the emergence of new business models (Freidman, 2005; Manning et al., 2018; Staab, 2024). Furthermore, outsourcing expanded not only due to a shortage of workers but also due to another wave of financialisation. During this period, outsourcing also served to reduce costs, generate revenue, and increase shareholder returns. In essence, outsourcing production inflates the company's value on financial markets by increasing profits per employee (Christophers, 2020). Consequently, the pressure from stockholders and financial markets also pushed companies to outsource production (Coe et al., 2014; Freidman, 2005; Parker et al., 2018). Thus, the drive for profitability led to the expansion of outsourcing to externalise costs and risks of software development.

The crucial condition for the emergence of global software development outsourcing is the territorial expansion of the global capitalist economy, which created a large global pool of skilled labour that tech companies sought and global production networks could tap into (Peck, 2017). This expansion was the consequence of the fall of the global socialist bloc in the 1990s, the subsequent hegemony of the market economy and ideology, and the expansion of English as a global language. Former socialist countries of Eastern Europe, including former Yugoslavia and the Soviet Union, were pushed into the global capitalist economy, which also coincided with the outsourcing of production to India, China, and other Asian countries. These countries subsequently became the main outsourcing destinations for software development. The main reasons for this are the sudden deregulation of economies with cheap labour and strong educational structures in these countries. This expansion led to a massive 'brain drain that filled in Delhi and Kyiv and emptied in Palo Alto' (Freidman, 2005).

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While demand for software developers rose exponentially, the number of STEM graduates in the US and Western Europe stagnated (Yost, 2017). At the same time, a large pool of STEM graduates in offshore locations across Asia and Eastern Europe was becoming available (Manning et al., 2018). While India remained a key outsourcing location (Aneesh, 2006; Narayan, 2025; Noronha & D'Cruz, 2016; Upadhya, 2016), Eastern Europe also became increasingly important. In the European context, the shortages in the Netherlands and Germany led to increased consideration of outsourcing to Eastern Europe, opening up labour markets due to the transition to capitalism. This led to the expansion of global production networks in search of high-skill and cheaper labour (Freidman, 2005; Hardy & Hollinshead, 2011; Medve-Bálint, 2024).

Eastern Europe quickly became a hub for nearshoring software development, with Russia, Ukraine, Romania, Poland, and Serbia leading the way. Software development offshoring was part of the broader push towards service outsourcing in Eastern Europe. In the early 2000s, a large wave of Foreign Direct Investment (FDI) flowed into Central and Eastern Europe, particularly in the business services sector, including IT support, in a market with a relatively underdeveloped IT sector. These Western companies hired thousands of workers in newly opened sites, often on large-scale projects (Hardy & Hollinshead, 2016a; Medve-Bálint, 2024; Sass & Fifekova, 2011).

Eastern Europe, in general, and Serbia in particular have emerged as desirable outsourcing or nearshoring locations primarily due to the availability of cheaper labour than in their home countries and with sufficient technical skills. According to the literature, the main comparative advantages of outsourcing software development to Eastern Europe include low labour prices, high technical skills, cultural and geographic proximity, linguistic skills, and existing infrastructure and government incentives (Hardy & Hollinshead, 2011; Kacani & Shaqiri, 2024; Kleibrink et al., 2018; Mateescu, 2022). While the region could not compete price-wise

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with countries like India or the Philippines, its advantages lie in higher proximity and higher education levels (Kotlarsky & Willcocks, 2009), as well as perceptions about higher proficiency. According to the Emerging Europe report,[23] which analyses Eastern European IT markets, Serbia's main advantage as an outsourcing destination is the IT talent/cost ratio. This indicator encompasses the price of labour and its volume, as well as the number of STEM graduates per capita, their growth, their ranking in international mathematics tests and competitions, and English language proficiency. Various commercial articles about software development outsourcing also highlight the relevance of these factors.[24]

This skilled and inexpensive labour in Serbia and other Eastern European countries was primarily developed through a long history of strong socialist technical education, combined with the economic collapse during the 1990s and the transition to capitalism (Hardy & Hollinshead, 2016a; Mateescu et al., 2024). More specifically, due to large investments in universal education during socialism and a particular focus on STEM research and education, these countries accumulated significant expertise and skills needed for the emerging software development industry. At the same time, the economic collapse in the 1990s left these skilled workers impoverished and without job alternatives, forcing them to join the outsourcing bandwagon. Consequently, IT outsourcing clusters started emerging in the old university centres with abundant labour across Eastern Europe (Hardy & Hollinshead, 2011, 2016a; Mateescu et al.,2024.; Medve-Bálint, 2024).

Another important factor was the spread of the English language and Western pop culture in Yugoslavia, which accounted for a cultural and linguistic proximity. Firstly, English language education was widespread in Yugoslavia, as it was the dominant second language in schools in

[23] Emerging Europe (2021) IT landscape report. Available at: https://emerging-europe.com/it-landscape-report/
[24] Examples include: https://www.digitalknights.co/blog/dissecting-serbia-nations-outsourcing-important-good.; https://sipodsoftware.com/outsource-serbia-hire-developers/ ; https://sipodsoftware.com/outsource-serbia-hire-developers/; https://www.morphnetworks.com/outsourcing/best-country-to-outsource-to-in-2020-serbia/

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the 1970s and 80s. This contrasts with the dominance of the Russian language in curricula in most of the Eastern European countries at that time. Furthermore, Yugoslavs had significant access to Western pop culture, including films, music, and clothing, which largely shaped Yugoslav identity, in contrast to the greater isolation of other Eastern European countries from Western pop culture (Luthar & Pušnik, 2010). This is largely a consequence of the breakaway from the Soviet-led socialist bloc and the legitimisation of the socialist regime through openness to US-inspired consumerist culture starting from the 1960s (Vucetic, 2018).

Thus, Serbia emerged as a key ´nearshoring´ destination not only because of its cheap and skilled labour, but also because of its cultural, linguistic, and, importantly, geographic proximity to Western Europe and the US (Hardy & Hollinshead, 2016a; Matijević & Šolaja, 2020). Unlike in manufacturing industries, software development typically requires extensive communication between different firms and their workers to collaborate on projects or define specifications (Feuerstein, 2013). Nearshoring, in which supplier companies and workers are in similar time zones, speak the same language and have similar cultural backgrounds, significantly reduces disruptions and transaction costs (Kotlarsky & Willcocks, 2009; Manning et al., 2018). Smaller enterprises, particularly those with small-scale projects and limited coordination abilities, prefer nearshoring due to the importance of proximity over price (Manning et al., 2018). Apart from internal communications, nearshoring is often preferred simply because clients prefer companies and workers from certain parts of the world, in this case, Europe (Aneesh, 2006; Manning et al., 2018).

The second part of the chapter will provide a historical account of how Serbia was plugged into global production networks as a software provider.

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The history of the IT sector in Serbia

While software development and IT had a long history in socialist Yugoslavia, the sector experienced significant growth in the mid-2000s, following its integration into the global production networks. In this section, I will briefly outline the pre-history of the IT sector, with a focus on software development before its globalisation. The section provides a brief overview of IT developments during socialism, followed by a breakdown and standstill during the 1990s, and the subsequent opening up and incorporation into the global production networks in the 2000s. Crucially, the section explains the emergence of key conditions of possibility for the development of an outsourcing-oriented IT sector, primarily the availability of skilled and comparatively cheap labour.

Making of the Yugoslav IT ecosystem from the 1950s to the 1990s

The history of IT in Yugoslavia dates back to the 1950s. It has its roots in the socialist state's efforts to develop information technologies to serve the needs of local socialist industry, education, and defence. It was designed not only with substantial financial support but also through significant ties with Western European countries. These ties enabled significant technology transfers in the form of software, hardware, and early access to the internet. The key legacy of the Yugoslav era in the field of IT is a vast network of research and education institutions, which have produced thousands of engineers and fostered a durable engineering tradition.

The beginnings of the IT sector in Yugoslavia can be tied to the state project of developing early mainframe computers for the Yugoslav nuclear programme and later scientific and defence purposes.[25] By 1960, only global economic superpowers, such as the US, USSR, UK,

[25] Oblakoder Magazin (2023) From digital dinosaur to selecting components to build personalized computers. What did the history of computer development look like in Yugoslavia. Available at: https://www.oblakodermagazin.rs/from-the-digital-dinosaur-to-selecting-the-components-to-build-personalized-computers/

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France, and West Germany, managed to design and manufacture their own computers. However, Yugoslavia quickly caught up with its first domestically produced computer, CER 10.[26] These early computer developments were tied to the country's leading technical institutes - the Vinča Institute for Nuclear Research and the Institute Mihajlo Pupin. The first mainframe computers in the country were used for simulations related to the nuclear programme at Vinča Institute. Still, after the projects were abandoned, scientists, along with the existing equipment, moved to other research institutions and continued working on information and communication technologies. The most significant of these institutions was the Institute Mihajlo Pupin, which was crucial not only for the development of the first computers but also for the production of early software, used in various industries in the country, such as banking or energy.[27] In addition to these two key institutions, other research institutions across the republics of the former Yugoslavia, such as the Institute Iva Lola Ribar, were conducting research in IT. Some enterprises, such as the gas and oil company NIS, utilised their computers not only for their core operations but also to provide services to other local companies, primarily in accounting. In addition to these research institutions, the Yugoslav military played a significant role in advancing information and communication technologies within the country. The military significantly invested in the development of both hardware and software, and many key scientists initially obtained knowledge and skills at the Military Technical Institute.[28]

In parallel with research, IT education also developed during this period. Primarily, the Faculty of Electrotechnical Engineering in Belgrade (ETF) introduced courses in informatics as early

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[26] Oblakoder Magazin (2023) From digital dinosaur to selecting components to build personalized computers. What did the history of computer development look like in Yugoslavia. Available at: https://www.oblakodermagazin.rs/from-the-digital-dinosaur-to-selecting-the-components-to-build-personalized-computers/

[27] Oblakoder Magazin (2023) From digital dinosaur to selecting components to build personalized computers. What did the history of computer development look like in Yugoslavia. Available at: https://www.oblakodermagazin.rs/from-the-digital-dinosaur-to-selecting-the-components-to-build-personalized-computers/

[28] Jandric & Vasiljevic (2018) Seventy years of the military technical institute (1948-2018) Scientific Technical Review. Available at: http://www.vti.mod.gov.rs/ntp/rad2018/1/1.pdf

as 1961. Informatics courses soon spread to other universities. In 1976, the first ever IT department was founded at the University of Mathematics in Belgrade. Other key universities in the Serbian Socialist Republic operating in IT included the Faculty of Technical Sciences in Novi Sad (FTN) and the Electronic Faculty in Niš. Some secondary schools, such as the Mathematics Gymnasium in Belgrade, were also crucial in IT education. Importantly, informatics subjects became available in Yugoslavian high schools as early as the beginning of the 1970s, making the country one of the global pioneers in this trend (ICT, 2010). These educational and research institutions were the key knowledge-creating institutions in Serbia during Yugoslav times and represented a basis for subsequent progress in technical education. During the 1980s, when the planned increase in informatics education was adopted, there were already thousands of graduates in IT-related areas in the Serbian Socialist Republic (Matijević & Šolaja, 2022).

In addition to the creation of skilled labour, three other components are crucial for understanding the development of what can be broadly referred to as IT- hardware, the internet, and software in Serbia. When it comes to hardware, following the early CER computers, the production of computers in Yugoslavia increased significantly after the founding of the first computer factory, FRM, in 1971. Through collaboration with Western companies, such as German Kienzle and American Honeywell Information Systems, mass production and installation of computers began in Yugoslavia. Computers were developed in different Yugoslav republics: EI Pecom 32 and EI Pecom 64 were produced in Serbia, ERA 20 and ERA 40 in Vojvodina, Galeb and Orao in Croatia, IRIS PC 16 in Bosnia, while Delta 800 were made in Slovenia.[29]. However, computers remained limited to public institutions and companies, and

[29] Oblakoder Magazin (2023) From digital dinosaur to selecting components to build personalized computers. What did the history of computer development look like in Yugoslavia. Available at: https://www.oblakodermagazin.rs/from-the-digital-dinosaur-to-selecting-the-components-to-build-personalized-computers/

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they were not widely available for private use (Hornok, 2016; Marković, 2017). Nevertheless, personal computers were still available, primarily through initiatives such as Galaksija, which allowed users to build their own computers from individual components. Furthermore, the import of popular computers from the West - ZX Spectrum, Commodore 64 and IBM PC further boosted computer use.[30] Ultimately, the grey economy enabled foreign technology to dominate the personal computer market, and software piracy continued to thrive. Consequently, during the 1980s, Yugoslavia was among the top 20 countries globally in terms of computer adoption per capita. However, they were unevenly distributed among the republics, with most concentrated in the richer republics of Slovenia, Croatia and Serbia. The adoption of computers slowed down towards the late 1980s (Marković, 2017).

In addition to hardware availability, Yugoslavia was one of the early Eastern European adopters of the initial versions of the Internet. Due to the scientific collaborations with Western European higher education institutions, Yugoslavia was linked to academic networks. Most notably, Yugoslavia was the first Eastern European country to be connected through EARN/BITNET during the 1980s and had an internet domain (Marković, 2017). In software development, it was primarily tied to various state projects during the 1980s. Firstly, software was developed at technical universities and research institutions for scientific purposes. Mainly, the Yugoslav Ministries of Science and Education funded these projects. Secondly, software development was closely tied to the military, and the Yugoslavian military supported both research and development of software for defence purposes. Thirdly, it was tied to public companies, where software was developed to automate processes such as accounting.

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[30] Oblakoder Magazin (2023) From digital dinosaur to selecting components to build personalized computers. What did the history of computer development look like in Yugoslavia. Available at: https://www.oblakodermagazin.rs/from-the-digital-dinosaur-to-selecting-the-components-to-build-personalized-computers/

In addition to the development of hardware, software, and the internet, other political and economic processes led to an increasing number of IT experts in Yugoslavia. Towards the end of the 1980s, thousands of IT experts operated in state institutions and amateur networks. Due to the severe economic difficulties the state faced in the mid-1980s, Yugoslavia gradually liberalised its markets and introduced cost-cutting measures (Woodward, 2020). In 1989 and 1990, economic reforms encouraged entrepreneurship and led to the exit of employees from public enterprises. According to the interviews, this led many IT engineers and researchers to start their own private companies. In the same period, key political developments unfolded in Novi Sad, including educational reforms in the autonomous province of Vojvodina, which resulted in the ousting of full-time researchers from universities, chief among them the Faculty of Technical Sciences in Novi Sad (FTN). While the largest number of these researchers migrated to Canada and the US, some of them switched to teaching, and many entered the private sector by founding new IT companies. This way, FTN Novi Sad became the primary hotspot for the development of IT companies in Yugoslavia, with pioneering private IT companies being run by current and former professors of the university, including some of my interviewees.

This led to a significant proliferation of IT companies in the Serbian Socialist Republic, particularly in Novi Sad. While many of these early companies failed due to insufficient market demand and inadequate entrepreneurial experience, some survived and went on to become major IT companies decades later. The post-socialist transition to entrepreneurship and market practices in the former Yugoslavia was, in many ways, an organic process rooted in the country’s long-standing experience with market socialism. Yugoslavia's long experiment with market socialism, shaped by neoclassical economics, profit-seeking self-managed firms, and deep ties to bodies like the IMF/GATT/World Bank, normalised market logic for its economists, managers, and institutions. When the political opening arrived, the government

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could repurpose these familiar practices and networks into capitalist ones, rather than building them from scratch as more centrally planned socialist states had to do. Furthermore, decades of economic decentralisation and enterprise autonomy, as well as market ideology, had already accustomed people to navigating market dynamics, making the shift to entrepreneurship not such a radical disruption (Bockman, 2020). However, this transition of IT from socialist institutions to private entrepreneurship was brief and limited in scope. Already in the early 1990s, these developments were halted by the breakdown of Yugoslavia, wars, international sanctions, and the complete collapse of the economy, which ruptured most of the progress made in IT up to that point.

The transformation of the sector throughout different periods can be well illustrated through one of the first Serbian IT companies, Ribar[31]. The company was founded in 1989 by a process engineer, Laslo, and two of his friends in Zrenjanin, a mid-sized industrial city in northern Serbia. Like many engineers at that time, Laslo and his partner relied on their engineering education and individual learning to develop software development skills. Their main goal was to create software for the optimisation of industrial processes with which they were familiar. Once they learned how to use the software, they started offering their services to local companies in Zrenjanin. They were among the pioneers of software development in the city; the demand was there as well. Zrenjanin was one of the key industrial cities in Serbia and Yugoslavia, and home to numerous successful public and private enterprises across various sectors. Laslo and his friends went door to door to different factories and farms, selling their technical solutions and providing training for their use. They were selling and setting up information systems, including both hardware and software, alongside network setup, product licensing, system administration, and infrastructure preparation. They were obtaining hardware

[31] From interview conducted on September 2024 with the owner´s son who took over the management of the company two decades later

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through importers, as such technology was not produced in Serbia at the time. The company grew to around 20 employees, with a large office in the city centre and a substantial amount of stockpiled equipment, and achieved exceptionally high revenues for the time. However, like many other companies, Ribar collapsed in the mid-1990s.

Economic isolation and collapse in the 1990s

The 1990s represented a discontinuity of many social and economic processes in Serbia and, more broadly, Yugoslavia, including, to a large extent, the development of the IT sector. After the 1991-92 breakup, subsequent wars, and the effective split of Slovenia, Croatia, Bosnia, and Macedonia, Serbia lost the integrated Yugoslav market and inter-republic supply chains, forcing firms to reorient their procurement and sales. In 1992, the UN imposed a near-total trade embargo, cutting off finance and air traffic and freezing official cooperation; war finance then fueled one of history's most severe hyperinflations, which lasted until 1994.

This meant the collapse of local socialist production networks and the almost complete exclusion from international economic and knowledge flows (Ghodsee & Orenstein, 2021). Furthermore, the Serbian economy was devastated throughout the 1990s, with mass deindustrialisation and extreme inflation rates (Deichman, 2021). This was followed by the mass impoverishment of the working classes in the country. In addition to the economic collapse, Serbia also faced unprecedentedly high unemployment rates in the mid-1990s. It is estimated that between 50% and 70% of the population lived below the poverty line during this period (Posarac, 1997; Sorensen, 2003). The old middle class largely disappeared, and small entrepreneurship in the grey zone was the most viable way for the semi-employed working classes to survive (Sorensen, 2003).

The IT sector suffered the same grim fate. Firstly, due to international sanctions, Serbia was largely cut off from the international academic networks and access to the Internet. Due to the

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war, the old Yugoslav telecommunications networks were destroyed, and common projects between republics ceased. At the same time, equipment and technology transfers from the West were suspended (Marković, 2017). According to the interviewees who ran IT companies during this period, due to international sanctions, wars, and hyperinflation, there was a significant decline in local private demand for software. Furthermore, the state almost completely stopped funding IT-related projects. Thus, there were no means, support, or customers for software development during this period. Consequently, the level of sectoral development of the early 1990s was not reached again until more than a decade later, after the economy entered the global capitalist market.

For Ribar, Laslo´s company, the breakdown of the country and its economy meant the closure of the business[32]. As factories collapsed, their contracts dried up. Many customers still owed them large sums, leaving the company in a dire financial situation. They managed to get only a fraction of this money after years of court cases. As Zrenjanin deindustrialised, clients disappeared, and businesses had to scale down rapidly. They started firing workers because they could no longer afford to pay any more salaries. As nobody needed software development services, they ceased providing them altogether. They continued selling hardware for a few more years with a minimal number of employees, but even then, there were no more customers. Towards the end of the nineties, the company was on the verge of bankruptcy and had to legally freeze the company and exit the IT sector, at least for several years, as the sector underwent a resurgence in a new form. Apart from Ribar, many software development companies halted their operations. After several years of economic devastation, a significant portion of the IT sector shifted to hardware reselling, piracy, and maintenance. Companies reselling hardware

[32] From interview conducted on September 2024 with the owner´s son who took over the management of the company two decades later

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managed to operate relatively well during this period, with the most prominent examples being Comtrade, Jugodata, and Pakom.[33]

During the 1990s, many IT workers and entrepreneurs were not lucky enough to work in the field. As was the case with most economic activity at the time, IT was also mainly in the grey economy. This meant that computer hardware was smuggled from abroad alongside the production and sale of pirate films, music, and video games. According to Mirko[34], another pioneer of software development in Serbia who worked throughout the 90´s:

> Most of us interested in technology had nothing to do in this period. There was no market or any opportunities. Many people I know turned to piracy. From this perspective, it is painful to imagine how, in the 1980s, we built our Yugoslav computers in scientific institutes, and in the 1990s, IT professionals would sell SEGA cartridges and floppy disks on the flea market.

Consequently, due to economic and political developments in the 1990s, the IT skills and knowledge produced by Yugoslav state initiatives were no longer needed in the disintegrating economy. Due to this lack of opportunities in 1990s Yugoslavia, there was a significant outflow of graduates and workers with IT-related qualifications (Matijević & Šolaja, 2022). Countries like the US, Canada, and Australia absorbed tens of thousands of highly skilled migrants or those with advanced education, many of whom had STEM backgrounds (Arandarenko, 2021; Dragišić, 2010; Grečić, 2002). Accordingly, in the early 1990s, around 1,000 scientists left Serbia, mainly those from natural and technical science backgrounds, which accounted for approximately 7% of all employed scientists in the country. For example, in this period, 116 scientists left Mihajlo Pupin, the most prestigious technical institute in Serbia (Dragisic, 2013). The main reasons for leaving Serbia included collapsing living standards, high uncertainty, and

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[33] Oblakoder Magazin (2023) From digital dinosaur to selecting components to build personalized computers. What did the history of computer development look like in Yugoslavia. Available at: https://www.oblakodermagazin.rs/from-the-digital-dinosaur-to-selecting-the-components-to-build-personalized-computers/

[34] Interview conducted in December 2022 with Mirko. He is one of the early software developers, starting his amateur IT carer in the 90´s.

a lack of available career prospects (Grečić, 2002). While the software development sector was declining in Yugoslavia, it was booming in the U.S., and many IT emigrants found work there. These emigrants also played a significant role in the development of the Serbian IT sector, as explained in the final section.

Still, software development continued in several places in Serbia during that period – notably in academia, in the public sector, and in a handful of private companies. However, this was at a smaller scale than at the beginning of the decade. Some software developers operated in academia, developing academic programmes. Some of them also worked in state-owned industries such as finance or the military. At the same time, engineers in public enterprises made and sold software for particular sectors. A significant number of amateurs who also had personal computers developed software, sometimes as freelancers or simply as a hobby. But demand for IT systems in the state enterprises still existed. Thus, they began turning to local experts, primarily professors and researchers at FTN Novi Sad and their private companies, who provided services to major companies in sectors such as energy and oil. In the process, they maintained and sometimes improved original IT equipment from the West, leading to significant skill development and innovation in the local ecosystem.

Once the international sanctions were partially lifted in 1995, following the conclusion of the War in Bosnia, the economy opened up to a limited extent, leading to significant developments in the IT sector. Multinational companies, such as Bosch and Siemens, began purchasing products and licences developed by companies around FTN during the 1990s, as a consequence of the local capability development under sanctions. In other words, while under sanctions, companies were forced to develop their own solutions or adapt the existing ones, thus acquiring crucial skills in the process. DMS, a company founded by professors and students from the Faculty of Technical Sciences in Novi Sad, exemplifies this continuity in the Serbian IT sector. Since 1995, the company has been developing electricity network management software for

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Elektrovojvodina, a public energy company.[35] Later, it expanded as the economy opened. Another example is RT-RK, which operated at the same university in the field of electronics, serving the domestic oil and gas, as well as the military industries. RT-RK was established as an intermediary faculty company to collaborate with the private sector. This market shift was a way for the Faculty to overcome the chronic lack of public funds, which led to low salaries, insufficient research funding, and poor research infrastructure.[36] Apart from these, several other companies produced software. These included Saga, PS Tech and Execom from Belgrade and Novi Sad. All these companies shared a similar fate later: as they began to grow significantly after the 2000s through the integration into global production networks, they were subsequently acquired by multinational companies. These processes will be explored in detail in the upcoming chapters.

Despite the standstill in the IT sector and all technological, economic, and political obstacles, software development outsourcing did exist in Serbia during the 1990s. Nevertheless, it was limited only to a small number of companies, and no reliable data on this phenomenon is available. A prime example of early outsourcing is the company RT-RK, which, after the lifting of international sanctions, developed software for a Czech telecommunications company[37]. The company was founded by three migrants from Bosnia, who fled the war and took over the international businesses of the previous technological socialist giant, Energoinvest. After that, through diasporic connections with a former FTN professor who had emigrated to Germany, the company also began developing software for microchips for Micronas, the only EU chip manufacturer at the time. The professor brought microchips from Freiburg to Novi Sad,

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[35] E-kapija (2015). "Windows" za elektrodistribuciju - Kompanija "Schneider Electric DMS NS" proizvodi najbolji softver za upravljanje električnim distributivnim sistemima.Retrieved from: https://www.ekapija.com/news/1178554/windows-fuer-verteilungsnetzbetreiber-schneider-electric-dms-ns-erzeugt-beste-softwares-fuer-die

[36] Yearly report of the RT-RK FTN Novi Sad 2015/2016.

[37] From an interview with a professor at FTN who was one of the founders of the company. Interview conducted in December 2024

primarily for television that local experts affiliated with FTN would programme. High inflation and extremely low salaries compared to German standards made Serbian labour extremely cheap.

Most outsourcing, however, was much more informal. According to Damir[38], one of the first people in Serbia to work in software development outsourcing in Serbia, his small team of developers would develop both simple and more complex software for European customers at the time, mainly in Germany and Austria. Due to numerous obstacles to outsourcing, this functioned through informal channels during the 1990s, particularly during international sanctions:

> The clients would send us a diskette or a paper with specifications of what we needed to do. Then, we would code and send the diskettes back. If everything went fine, they would send us cash in an envelope. Sometimes, we did this through the mail, primarily through intermediaries. Those were mostly people with dual citizenship who could easily cross the borders, whose parents had migrated to Austria or Germany in the 70s. Sometimes, they (the intermediaries) would also find clients for us, but often, we would get in touch through university professors or informal connections… It was only in the late 90s that we could communicate with them via email. Before that, we had no proper internet and even sending emails would consume all the data. We could also not receive money until the early 2000s, when German banks first opened in Serbia. So, this was the only way.

Notably, such outsourcing was largely marginal, with only a handful of smaller teams operating in the software outsourcing industry. Many of these teams relocated to other countries during the 1990s due to political and economic instability in their home country.

Labour in transition during the early 2000s

SR Yugoslavia, comprising Serbia and Montenegro, began its integration into the global capitalist economy in 2000 with the collapse of the socialist regime. The primary strategy for stabilising the economy was the unregulated privatisation of state-owned companies, followed by asset seizures at low prices and massive layoffs (Deichmann, 2021; Upchurch &

[38] Interview with Damir, one of the early software developers in Serbia in the 1990´s, conducted in January 2023

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Marinković, 2011), or the temporary exploitation of cheap, massive pauperised labour through low-value-added, labour-intensive production (Radenković, 2016). All of this led to low wages and a weakened labour power (Upchurch & Marinković, 2011). Due to the lack of quality employment opportunities, the situation was similar for highly skilled workers, who did not have significantly better economic prospects (Radenković, 2016). At the same time, as in the rest of Eastern Europe, due to high levels of deregulation and loose labour laws, workers were also made exceptionally flexible and precarious (Bohle & Greskovits, 2007).

Although, Serbia was a late entrant to the European IT sector outsourcing market. The capitalist transition in Serbia began later than in the rest of Eastern Europe due to international isolation, the violent disintegration of Yugoslavia, and slow deregulation of the economy, which benefited the bureaucratic elites (Bohle & Greskovits, 2007; Lazić, 2011; Upchurch & Marinković, 2011). Thus, the first wave of outsourcing from Western Europe went to the largest markets with vast pools of highly skilled ICT labour – Russia and Ukraine. In the second wave, international companies began outsourcing to countries such as Poland, Hungary, and Romania, and later to Serbia. According to the director of a significant IT company association[39], "Serbia had a late start in IT as we lost a decade in wars and sanctions and then another decade in wild privatisations. Only around 2010 can we talk about the real take-off." Although compared to other post-Yugoslav republics, the IT sector in Serbia developed primarily due to the availability of a large pool of labour, lower salaries, and the significant agglomeration of university cities, including Belgrade and Novi Sad.

The expansion of global production networks thus coincided with the sudden availability of cheap, skilled, and physically proximate labour in Serbia in the early 2000s. As outlined in the previous sections, Yugoslav research and educational institutions produced a large number of

[39] The association gathering largest and most influential IT and telecommunication firms in Serbia. The director worked in the sector since the 1990´s. Interview conducted in February 2022.

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engineers and established a strong ICT tradition that endured the collapse of the 1990s. The 1990s and the subsequent capitalist transition led to widespread worker impoverishment, making these engineers significantly cheaper than in core firm countries. Furthermore, due to Yugoslavia's geographic position and its relatively liberal cultural ties with the West, this labour was also geographically, culturally, and linguistically proximate.

With the rise of the IT sector and outsourcing in the mid-2000s, the industry began to absorb large numbers of engineers. Due to newly emerging opportunities, the brain drain of ICT experts slowed down (Matijević & Šolaja, 2020). Although skilled migration continued, it was partially offset by the influx of students with Serbian backgrounds from neighbouring countries, such as Bosnia and Montenegro. As the largest economy in the region, with Belgrade and Novi Sad as major urban agglomerations, Serbia had become an increasingly attractive destination for high-skilled immigrants from the region (Arandarenko, 2020, 2021). These migrants were largely filling up the growing number of job openings in the sector. Due to the increasing demand for IT workers, a close relationship had developed between IT companies and universities. The clearest example of this is the FTN in Novi Sad. Not only were the key IT companies founded by professors and students from the university, but some of the largest IT companies established their own departments at the university, producing profiles that meet their immediate business needs.[40] This was also the case with other universities, primarily the ETF in Belgrade.

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[40] As for example per these news articles: https://www.021.rs/story/Novi-Sad/Vesti/216073/Francuzi-kupili-ceo-DMS-poceli-problemi-na-FTN.html; https://www.021.rs/story/Novi-Sad/Vesti/149193/Neobicne-veze-uprave-FTN-a-i-DMS-a.html

Thus, strong engineering education was a key legacy from Yugoslav times that enabled the rise of the IT sector in the mid-2000s. As the CEO of one of the first major outsourcing companies[41], that relocated software development from Netherlands to Serbia, explains:

> Historically, the whole of Eastern Europe, including Serbia, had sound engineers. Not the best, but quite decent and sufficiently good to develop software for companies in the West. Furthermore, these countries had ample supply of engineers and continue to do so. While the number of software developers in the Netherlands has stagnated, it has been and still is booming in Serbia, Romania, and Ukraine. These engineers were the primary reason why companies began outsourcing here.

Low labour costs, combined with the availability of skilled labour, were the key conditions that enabled the emergence of the outsourcing-oriented IT sector. As already outlined, the 90s saw a radical impoverishment of workers, including those with higher education. The transition to capitalism in the early 2000s opened this mass of cheap and desperate labour to global markets. This is the context in which the IT sector began to develop in Serbia. In the overall context of impoverishment, companies could pay wages several times lower than those in the client countries of the US and Western Europe, yet still much higher than in those other available employment opportunities. Estimating the exact salaries of software developers in the sector during the 2000s is challenging due to a lack of reliable statistics. However, interviews with IT pioneers indicate that the average salary for software developers ranged from 300 to around 600 euros per month, significantly below what companies would pay in their home countries.

Thus, due to the overall lack of employment opportunities for highly educated people in Serbia, apart from migration to the West, IT was the only pathway to decent earnings. As will be argued in Chapter 4, it also facilitated class mobility. As mentioned at the beginning of the chapter, the salaries in the IT sector are, on average, up to three times higher than the overall average salary

[41] The company started its outsourcing operations in Serbia in 2005. They were one of the first firms to establish connections between Dutch clients and IT workers in Serbia. Interview conducted in October 2024.

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in the country.[42] Furthermore, IT salaries in Serbia, compared to the country's GDP, are among the highest in Europe.[43] This means that IT workers' salaries in Serbia are exceptionally high by local standards, while still being relatively low compared to Western companies.

The CEO the company, subcontracting work from the Netherlands mentioned previously, described the importance of low wages for the emergence of the Serbian IT sector:

> The incentive for outsourcing to Serbia was primarily cost. The demand was increasing in the West, and we were dirt cheap. We were hungry for work, as we were destitute and had no other opportunities. I still remember when, at the very beginning of our business, a Dutch client told me how they were missing this kind of hunger in the West, as they were too comfortable there. At that time, developers in Serbia were around four times cheaper than in the Netherlands. In Serbia, the starting salary for juniors was 400 euros. 700 was the maximum if you were a senior. In the Netherlands, you could not find anyone with at least some experience for less than 2000 euros. The best ones were often much more expensive or unavailable.

Importantly, labour in Serbia was cheap not only because of the country's general impoverishment and lack of other opportunities, but also because of the regressive tax system. The early-2000s tax reforms introduced flat tax rates, scrapped the minimum-wage tax break, folded lunch/holiday perks into taxable pay, and set minimum contribution bases for low-paid jobs. This practically meant that low-wage sectors became more expensive to hire in, while hiring workers with comparatively high salaries, such as in the IT sector, became cheaper at the margin. Furthermore, the shift to VAT/indirect taxes pushed up basic prices and cut the incomes of lower-income workers, while the top half gained. These reforms were generally designed to attract more foreign investment, similar to the rest of Central and Eastern Europe (Arandarenko & Pavlović, 2023). One of the key reasons firms expand their production networks to specific locations is legal arbitrage, or taking advantage of national differences in regulatory regimes (Coe & Yeung, 2015; Fisher et al., 2009). In software development, this

[42] "Puls Srpske IT zajednice: Prosečna plata programera i do tri puta viša od prosečne plate u Srbiji," HelloWorld.rs, accessed July 8, 2022, https://www.helloworld.rs/blog/Puls-Srpske-IT-zajednice-Prosecna-plata-programera-i-do-tri-puta-visa-od-prosecne-plate-u-Srbiji/13732.

[43] Emerging Europe (2021) IT landscape report. Available at: https://emerging-europe.com/it-landscape-report/

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primarily means labour flexibility and low income taxes (Flecker & Schönauer, 2016). In Serbia, flat income taxes and loose labour regulations are viewed as the primary regulatory incentives to stimulate growth in the IT sector (Matijević & Šolaja, 2022). On top of factors outlined above, this further incentivised outsourcing to Serbia and the inflow of workers into the sector,

In addition to the low corporate profit tax, which was only 10% from 2001 to 2015, among the lowest in the world (Arandarenko & Pavlović, 2023), low-income taxes also stimulated the sector's growth. The primary hallmark of the Serbian tax regime is the prevalence of non-progressive, and even regressive, taxes (Aleksić & Arandarenko, 2022). Taxation is not progressive because the main burden on wages is social contributions, which are fixed, and income taxes are relatively flat, meaning that all income categories pay around the same share of income. Furthermore, the fixed lump sum taxation of the self-employed, which is prevalent in the sector, significantly reduces the percentage of tax burden as income increases (Arandarenko & Pavlović, 2023). Ultimately, the Serbian taxation system was designed in a way that heavily burdens low-wage workers while benefiting those with higher wages, particularly in the IT sector (Aleksić & Arandarenko, 2022; Arandarenko, 2020)

Finally, in addition to skills and low labour costs, geographic, cultural, and linguistic proximity were among the main reasons why Serbia became an attractive outsourcing location. While geographic proximity was a factor, Serbia had stronger cultural ties and higher English-language skills than other Eastern European countries due to its Yugoslav ties to the West and the country's openness to Western culture, as explained previously. According to the CEO of a pioneering outsourcing firm referenced previously[44]:

> We were doing nearshoring, which meant being close to clients. Apart from being physically close, meaning that clients could easily come here whenever they wanted,

[44] The company started its outsourcing operations in Serbia in 2005. They were one of the first firms to establish connections between Dutch clients and IT workers in Serbia. Interview conducted in October 2024.

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> Serbia was also culturally close to clients. By this, I mean that people in Serbia spoke English well, shared the same cultural references, and often met in bars. This was not only an advantage over traditional outsourcing destinations in Asia but also over countries from the former Soviet Union. We also have branches in Romania and Ukraine, but they had very different communication styles and didn't understand some of the things we were talking about, such as Monty Python jokes. It was a different cultural sphere back then, so they could not relate. So, this automatically gave us an advantage in getting more work.

Ultimately, the combination of all these factors led to the emergence of a workforce suitable for software development outsourcing in Serbia in the mid-2000s.

The rebirth of the Serbian IT sector in the mid-2000s

While the rebirth of the sector can be traced to the mid-2000s, IT companies began re-emerging at the beginning of the century, initially focusing mostly on the recovering domestic market. A few companies were also outsourcing to foreign companies, although this was a marginal phenomenon. Small clusters of developers were working for foreign companies, mostly illegally or semi-legally. Policy regulations, technical capabilities or business ecosystems that would enable the expansion of the sector were quite limited.

While labour was available and global demand was emerging, several other conditions needed to come together to enable the emergence of the export-oriented IT sector. From a financial perspective, mass outsourcing could only emerge after shifting financial flows from state institutions to private banks, introducing VAT, and establishing payment regulations. The second condition was the emergence of high-speed internet. While the first connections to the Internet were established in 1996, these were extremely ineffective and limited (Marković, 2017). However, in 2003, the first high-speed internet connection appeared. Although it was limited to a fraction of users, it was sufficient to kickstart the outsourcing revolution in major future IT hubs, such as Belgrade and Novi Sad (Mijačić et al., 2011). Thirdly, due to the lifting

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of international restrictions, personal computers became widely available to Serbian citizens and companies in this period.[45]

Crucially, technical universities and the expertise they fostered survived the 90s and served as key incubators for company development. This was particularly true of the Faculty of Technical Sciences (FTN) in Novi Sad. Companies such as RT-RK and DMS, having gained significant experience, now began operating internationally and taking on large projects, primarily in embedded software. Furthermore, according to a former professor and IT sector pioneer, FTN began adjusting its study programs to meet the needs of affiliated companies, training students for work in the private sector. While initially there was resistance to this practice due to a supposed conflict of interest, opinions about it soon changed when the economic potential of channelling students towards outsourcing was understood. Further skill development, the inflow of investments and projects, high student salaries, and the prevention of brain drain followed. This laid the groundwork for the re-emergence of the IT sector in Novi Sad and, more broadly, in Serbia, as it grew through a snowball effect with the rise and split of companies associated with the university. This prominent role of universities in the development of the private IT sector was similar to that in Romania, particularly in cities like Cluj (Medve-Bálint, 2024).

The crucial moment in the sector's integration into global production networks was in the mid-2000s, marked by the influx of foreign companies into the local market. A benchmark year was 2005, when Microsoft opened its development centre; several other foreign companies, such as Levi9, followed suit. The entry of the first large multinational companies paved the way for further globalisation in the sector, as was the case with Intel entering Poland in 1999 and Nokia

[45] Oblakoder Magazin (2023) From digital dinosaur to selecting components to build personalized computers. What did the history of computer development look like in Yugoslavia. Available at: https://www.oblakodermagazin.rs/from-the-digital-dinosaur-to-selecting-the-components-to-build-personalized-computers/

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entering Romania in 2006. Such companies demonstrated to others that it is worthwhile to invest in IT in Eastern Europe (Medve-Bálint, 2024). Thus, 2005 marks the year when the first multinational companies began opening branches in Serbia, while local outsourcing companies and freelancers gradually began working for foreign clients. This was also the period in which global demand for software developers started to grow significantly, as explained earlier in the chapter.

Ribar, the company Laslo closed in the 1990s, also resurfaced in this period after years of stagnation[46]. Laslo´s son, Oskar, was one of those who saw an opportunity in the IT outsourcing revolution and the country's integration into global capitalist flows. In 2005, as a student at the newly opened software development department at the FTN in Novi Sad, he started working as a freelance software developer through online labour platforms. As shown in the next chapter, these digital platforms played a key role in globalisation and the development of the Serbian IT sector. After working for months on the platform and building a sufficient client base, Oskar decided to reactivate his father's company in Novi Sad. Finding clients on digital platforms and working for them together with his friends, Oskar became one of the pioneers of the new Serbian IT sector. This time around, Ribar did not service local industrial firms but focused only on software companies from Western Europe and the US. This makeover of Ribar exemplified a broader transformation in the Serbian IT sector and the national economy as a whole.

Like Ribar, many companies transitioned from serving the needs of the local socialist industrial ecosystem to becoming subcontractors for Western companies seeking cheap, skilled software developers. These processes will be described in detail in the upcoming chapters. As for now, it is worth noting that, as with other sectors, while the old socialist industrial networks lost their

[46] From interview conducted on September 2024 with the owner´s son, Oskar who took over the management of the company in 2008. Ribar is currently one of the successful IT firms in Novi Sad

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relevance, companies repurposed old resources, reorienting them towards integration into the global production network. In a research study of Serbian SMEs, including IT companies, many identified the country's legacy of engineering and technical skills from socialist industrialisation as having a direct impact on the development of their businesses (Avlijaš et al., 2023). However, unlike in some other Eastern European industries, such as apparel and electronics (Plank & Staritz, 2013), in the Serbian IT sector, no direct continuity exists between socialist and new international production networks. Only a few IT companies remained operating throughout this period of transformation. However, the key indirect continuity was preserved through the major educational and research institutions and the skilled labour force they created.

The state, market forces and brokerage – globalising the sector

Who drove this process of outsourcing? It could be said that the development of the Serbian IT sector was mostly guided by market forces, without a structured economic development agenda, meaning that it was not directly supported by the new capitalist state (Avlijaš et al., 2023; Avlijaš & Gartzou-Katsouyanni, 2024; Mijačić et al., 2011). Unlike state-supported IT sectors in countries like the US or India, the sector only caught the state´s attention in its later stages of development when it became profitable. As in other Eastern European countries, Serbia adopted a neoliberal, deregulated approach to the economy, with limited state intervention (Bohle & Greskovits, 2007; Plank & Staritz, 2013). Due to general poverty, high unemployment, and a lack of alternative economic views, Serbia and other Eastern European countries were converging into 'competition states', competing for foreign capital mainly through scraping regulations, primarily those related to taxes and labour protections (Drahokoupil, 2008). In this way, the development of the IT sector in Serbia resonated with that in Romania, which also developed without direct state support (Medve-Bálint, 2024).

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However, despite planned and active engagement, the state's role remained crucial in this process. In its early years, the state's main role was limited to two areas: maintaining educational institutions that produced engineers who survived Yugoslav times and introducing loose labour laws and a regressive tax system, with the lack of enforcement mentioned above. More specifically, those with higher salaries in the IT sector were taxed proportionally less and were able to avoid taxation completely on monetary transfers from abroad (Arandarenko, 2020). However, this does not appear to be a planned initiative to support the sector.

Although the state played a much smaller role in the development of the IT sector than in countries like India, it would be a mistake to view the emergence of the IT sector in Serbia as the result of the state's neglect (Mazzucato, 2011). The policy environment played a significant role, with the state as the main architect of the GPNs, providing key resources in the sector - skilled programmers. Free and accessible technical education has produced and continues to produce the labour for the sector (Narayan, 2025). As described above, most of the early entrepreneurial activity in the sector happened exactly at these state-owned universities. Still, the state did not explicitly work on developing the sector through development agencies like, for example, in Poland (Medve-Bálint, 2024), and it is far from what might be labelled as ´entrepreneurial state´, facilitating innovation and industrial upgrading (Avlijaš & Gartzou-Katsouyanni, 2024; Mazzucato, 2011).

The sector also did not emerge at the initiative of global companies that decided to cut costs by outsourcing to Serbia. While the state provided labour and global companies facilitated demand for it, the new international production networks were woven together by key brokers (Stovel & Shaw, 2012) who recognised the opportunity to connect previously separate labour supply and demand. In Chapters 2 and 3, I will describe the role of the two main types of brokers in value capture processes - online labour platforms and local subcontracting companies. However, before that, I will first introduce the initial brokers - the Serbian diaspora.

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Before large companies began to view Serbia as an outsourcing destination, the diaspora, with knowledge of both the local context and global markets, initiated connections between clients and workers. The brokers mostly came from the ranks of the Serbian IT diaspora in the US and Western Europe – largely comprising people who left the country during the late 1980s and 1990s. One of the first IT entrepreneurs and a professor at FTN[47], remarks that most outsourcing occurred through *´ićić'* connections.[48] This meant that people from the Serbian diaspora either initiated contacts with Serbian companies on behalf of clients in Western countries, sought clients for Serbian companies, or founded their own companies to connect supply and demand. These were essentially IT experts or experts in related fields who were well-versed in the markets and had maintained connections in Serbia, again primarily through technical universities. As the interviewed professor comments, "some of them did it for profit and some for patriotism and friendship".

As already mentioned, migration and body shopping in the U.S. were, in the mid-2000s, replaced by outsourcing, which proved to be significantly cheaper. However, to outsource production effectively, individuals with knowledge of both the U.S. and the context of outsourcing destinations were crucial. Thus, those migrants slowly started returning to their home countries in the 2000s, utilising their industry expertise, cultural knowledge, and social connections to establish outsourcing companies and branches of multinational companies. (Manning et al., 2018; Saxenian, 2006). This way, the ´new argonauts´, as Saxenian (2006) calls them, brought software development to their home countries by becoming key facilitators of expanding global production networks. As in other Eastern European countries, such as Poland and Romania, firms established by expatriates have set up links with foreign capital (Medve-Bálint, 2024).

[47] Interview conducted in December 2024
[48] Ić is a common suffix on Serbian last names – implying ethnicity-based connections

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The most consequential diaspora for the development of the sector was in the US, which itself had the most developed IT industry. However, the migrants to Western Europe also played a significant role in this process. As Serbia opened up, these migrants leveraged their contacts and knowledge to connect Serbian software developers with Western European software companies. Such brokering was necessary as foreign clients and investors had doubts about outsourcing to Serbia due to the unstable economy, unreliable legal system, and a negative international reputation following the Yugoslav wars and the country´s breakdown. Foreign companies began to flock to Serbia several years later, only after key brokers had paved the path. There are several significant examples of such early IT brokers in the Serbian IT sector.

The first example is the opening of the Microsoft Development Centre in Serbia. The Serbian branch was opened at the initiative of senior Microsoft employees of Serbian origin who wanted to return to Serbia and establish it as an IT hub. It was not Microsoft management that initiated outsourcing to Serbia; rather, Serbian engineers set up a centre despite leadership's reluctance and minimal support. Their vision was to bring software development back to the country from which they had fled. The Microsoft development centre was initially established in a private apartment in Belgrade, with as few as seven employees. They received support for expansion only several years later, following the 2008-9 economic crisis and a significant increase in labour demand.[49] The initiative later evolved into one of the largest and highest-paying IT companies in Serbia and a key Microsoft development centre in Europe. According to some accounts, the opening of the Microsoft Development Centre was a key facilitator of the IT sector's expansion, as it signalled to other companies that Serbia was becoming an outsourcing destination (Ilahi et al., 2019). Research reports and interviews with branch founders indicate that this event has helped change the country's negative image, largely shaped

[49] Taken from odcast interview with a former directero of Microsoft Development Center in Serbia who was involved in company´s early days in Belgrade: https://www.youtube.com/watch?v=BETgWCf2n6w&t=5493s

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by the Yugoslav wars and the NATO war only a few years prior, slowly convincing other companies that it was safe and profitable to operate in Serbia.[50]

The second example is Levi9, a Dutch software nearshoring company founded in 2005 in Novi Sad. One of the Serbian IT migrants in the Netherlands utilised his connections with clients and engineering friends in Serbia to establish a small outsourcing firm in the early 2000s. After several successful projects and growing reassurance from Dutch companies that software developers in Serbia are a highly lucrative investment, he founded Levi9 with Dutch partners who provided capital. The company's primary business model was to find clients in the Netherlands and offer them engineers through its Novi Sad branch. As the company accumulated experience and technical and business knowledge and earned client trust, it became one of the most prominent outsourcing companies in Serbia, operating in several cities with hundreds of employees.[51]

Brokerage is a common theme in the development of the Serbian IT sector. Their importance lies in bringing together foreign companies and Serbian labour, thus putting together global production networks. While the first brokers were return migrants making initial connections between Serbia and the international markets, online labour platforms enabled such connections at scale, leading to the proliferation of freelancing and the emergence of local subcontracting software development companies.

The integration of the IT sector into global production networks

The emergence of Serbia as a key outsourcing destination is the result of the convergence of the global drive for outsourcing and favourable local conditions. While global production

[50] Taken from odcast interview with a former directero of Microsoft Development Center in Serbia who was involved in company´s early days in Belgrade: https://www.youtube.com/watch?v=BETgWCf2n6w&t=5493s
[51] Based on my interview with a high company executive involved from the beginning of the company operations, conducted in October 2024

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networks expanded across the globe in search of labour, Serbia acted as a reservoir of skilled, comparatively cheap ´European´ workers in the semi-periphery with a socialist legacy of skills and infrastructure.

This conjunction was preceded by a long history of IT in the country. Local IT research and industry were underway in Yugoslavia, oriented towards the local socialist market. However, most developments in this area ceased due to the economic collapse, the disintegration of local production networks, and the halt of technology flows with Western Europe. However, precisely because of its socialist education and research systems, key state value-creation processes, and the devastating transition to capitalism, the emergence of a large pool of high-skilled and low-cost labour was possible in Serbia.

In the mid-2000s, the country's economic opening coincided with the global expansion of outsourcing, integrating these workers into global production networks. Driven by massive economic opportunities to connect this supply of valuable labour with demand in Western companies, many brokers emerged, becoming a key engine of the Serbian IT sector's development. Most of these brokers were Serbian migrants to the West, who moved abroad during the country's collapse. As they were incorporating Serbian workers into global production networks hungry for labour, the Serbian IT sector was reborn. However, this time, it was not made to serve local industry, defence, or the public sector; it was completely re-oriented towards foreign markets. Serbia was thus quickly becoming a key outsourcing destination, entering the global market as a labour and service supplier.

These processes represented a foundation for the value-capture processes this thesis focuses on. In the upcoming chapters, I will provide a deep dive into the Serbian IT sector by analysing outsourcing after its emergence in the mid-2000s and outlining the subsequent value capture dynamics in detail. In the following two chapters, I will analyse the sectoral development

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phase by focusing on two key players in the Serbian IT sector: online labour platforms and subcontracting companies. This way, I will analyse different mechanisms of labour sourcing and struggles for value capture in uneven geographies. But before that, I will focus on the role of online labour platforms, which were consequential in the emergence of companies, although less relevant for later stages of sectoral development.

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CHAPTER 2: DIGITAL MIDDLEMEN AND CATALYSTS: ONLINE LABOUR PLATFORMS IN THE SERBIAN IT SECTOR

Chapters 2 and 3 introduce the integration phase of the sector, characterised by a high global labour demand and low local labour prices, which give rise to labour intermediaries in the form of online platforms and subcontracting companies that integrate labour into global production networks. In this chapter, I focus on online labour platforms, which played a crucial role in the proliferation of the Serbian IT sector (Andjelković et al., 2019; Arandarenko, 2020; Matijević & Šolaja, 2022). While emerging simultaneously with subcontracting companies, I first analyse online platforms, which represent the simplest form of outsourcing to individuals with the lowest local value capture (Aridi et al., 2021), and also set the conditions for the emergence of subcontracting companies.

In simplest terms, online platforms are intermediaries that connect companies and workers to complete specific tasks online, manage labour processes, and profit from intermediation. These should be differentiated from other types of platforms, such as advertising, industrial, product, or cloud platforms, as they focus on the provision of labour, but also from on-site labour platforms, such as ride-hailing or delivery, as the work happens only online (Srnicek, 2021).

Researching online platforms is crucial for understanding outsourcing in the Serbian IT sector for two main reasons. Firstly, platform workers are significantly overrepresented in the sector. According to the Oxford Online Labour Index,[52] Serbia has among the highest relative numbers of IT platform workers globally and ranks 7th in absolute terms. Furthermore, the number of self-employed IT workers in 2024 reached almost 23,000, representing a third of the total

[52]Oxford Online Labour Inde represents a comprehensive and regularly updated database including numbers and profiles of platform workers across major English-speaking online labour platforms. Available at: http://onlinelabourobservatory.org/

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software developers in the sector.[53] Secondly, platforms enabled important interconnections between Serbian workers and foreign companies, leading to the establishment of many local companies, the integration of the sector into global production networks, and the proliferation of non-platform remote work. While platforms are no longer highly relevant in the sector, they played a significant role in its initial stages.

In this chapter, I analyse value capture processes surrounding outsourcing through these platforms. Most of the chapter is devoted to the role of digital platforms in GPNs as value-capturing agents and intermediaries who facilitated the sector. The main argument of the chapter is that platforms enable high-value capture for themselves and for companies that use them to find workers, mainly by externalising labour costs onto the state and workers. These platforms benefit only a minority of workers while setting up an exploitative labour process and fostering unpaid labour. Still, they were extremely popular because they offered the promise of high earnings, flexibility, and untaxed side income. More importantly, they act as catalysts, providing direct connections between Serbian workers and foreign companies, reducing the transaction costs and playing a key role in the proliferation of companies, globalisation, and the development of the sector. Thus, my key argument is that such intermediation can be seen both as value creation and value capture at the same time.

From the workers perspective, platforms thus act both as traps and ladders. Firstly, they act as value-capturing firms, accruing digital rents through controlling both access to workers, jobs, infrastructure, and information. At the same time, through the labour process and algorithmic management, they are maximising value extraction from workers for clients and themselves. Secondly, they also act as catalysts, integrating Serbian workers into global production

[53] Data taken from the APR – Serbian Enterprise Registry Agency in November 2024. Important to note: this figure also includes those working both for companies and freelancing, and it does not include a large number of those not registered.

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networks, leading to disintermediation and diminishing their role. This means that platforms with intensified competition also lose their ability to capture rents, paving the way for novel patterns of value-capture.

The chapter will be primarily based on a case study of Serbian software developers working on the most globally popular online labour platform, Upwork. Here, I rely on three complementary data sources. Firstly, I will analyse the mechanisms of labour organisation and governance of online labour platforms by examining specific functionalities of the Upwork platform. Secondly, to gain qualitative insight, I will reflect on interviews conducted with Serbian software developers who worked on Upwork and other similar digital platforms. Thirdly, to map the main trends of platform work in Serbia, I rely on two types of data: data I scraped from Upwork profiles of Serbian platform workers and secondary data - statistics from previous research. Using these different data sources enables me to analyse how platforms structure workers' positions and extract value, and how workers strategically use platforms to their own ends.

In the first section, I will briefly introduce the theoretical framework through which I will analyse the platforms, and then contextualise the work on digital labour platforms in Serbia. In the second part of the chapter, I will outline the broader implications for the value capture of online labour platforms.

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Online platforms, global production networks, rents and brokerage

Multiple conceptions of online labour platforms have emerged in the literature, theorising their distinct roles (Vallas & Schor, 2020). Firstly, some authors have labelled platforms as useful mechanisms for lowering transaction costs in the economy and opening up entrepreneurship opportunities by linking different peers as they enable efficiency, flexibility, build trust, and optimise the use of assets and labour (Horton & Zeckhauser, 2016; Sundararajan, 2017). This

perspective has been significantly challenged in the critical literature due to the emerging large power of platforms that soon turn into monopolies, being detrimental to labour and actively steering regulation (e.g. Lehdonvirta, 2022; Srnicek, 2021; Vallas & Schor, 2020)

Other authors took a more critical perspective: for example, some viewed platforms through the lens of workers' control and governance (e.g. Altenried, 2022; Lehdonvirta, 2016; Rosenblat & Stark, 2016; Wood, 2021). In these views, platforms represent new digital regimes of labour control that attempt to subdue the workers, while workers are also seen as resisting platform governance. These regimes of labour control are guided by algorithmic management, information asymmetries, and gamification, subjecting workers to surveillance, ensuring their compliance while fragmenting and curbing their resistance. These authors also highlight the workers' tactics of countering the platforms, showing the limits of total control.

Other authors see platforms not so much through the lens of control and novelty, but as accelerators of precarity. This means that platforms continue to further establish capitalist practices that increase workers' precarity and reduce their power (Wood et al., 2019a, 2019b). The platforms aim to erode standard employment and eliminate worker protections, thus reducing externalising costs and increasing workers' flexibility. Additionally, platforms offer significant flexibility, as the labour force can be scaled up or down in a matter of minutes. From the perspective of power relations, platforms enable the fragmentation of the workforce with limited bargaining power, unable to organise and demand improved working conditions from employers.

Finally, some perspectives also highlight the role of platforms as anti-markets. Instead of enabling open, competitive exchange, they act as private, centrally governed infrastructures that set the rules, control visibility, and extract value like corporate states rather than neutral marketplaces and intermediaries (Lehdonvirta, 2022; Varoufakis, 2024).

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I subscribe to the perspective that views platforms as hybrids possessing characteristics of all of the above perspectives, but seeing them primarily through the lens of value capture (Vallas & Schor, 2020). Platforms are centralising power and increasing control, but at the same time, they also distribute control and risk, leading to precarity, as well as freedom and inclusion. Platforms increase control over key value-generating processes such as pricing, data, reputation, and allocation; while they externalise costs, provide sufficient attractiveness for workers and reduce transaction costs for companies. However, platforms also serve as facilitators of value creation as they create novel markets, reduce transaction costs, and optimise production.

I build on this position and align with other authors who emphasise the centrality of value-capture dynamics in analysing online labour platforms (Howson et al., 2022, 2023; Kenney & Zysman, 2020; Vallas & Schor, 2020). I do this to show the multifaceted nature of online labour platforms, stemming from their ultimate goal of capturing value while also enabling value capture for both client companies and workers by creating interconnections and reducing transaction costs. Furthermore, this approach enables me to study their role in global production networks and to shape the dynamics of value capture in the Serbian IT sector, thereby seeing platforms as part of broader sectoral trends rather than isolated phenomena (Coe & Yeung, 2015; Butollo, 2022).

As explained in the previous chapter, due to rising demand for software development, global production networks were expanding to access labour across the planet. Online platforms enabled companies to hire workers for workflows remotely, primarily through digital platforms (Dibbern & Hirschheim, 2020; Huws, 2014). Importantly, this enabled novel mechanisms of value capture for the client companies. Firstly, it facilitated access to cheaper, more flexible labour without the need to set up branches in other countries or to contract with local outsourcing firms, making platforms essentially labour intermediaries (Coe & Jordhus-Lier,

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2011). Secondly, platforms also shape the labour process in such a way as to increase value capture by lead companies. In GPN terms, they allow codification of complex production specifications, allowing lead firms to reduce costs by outsourcing most employment-related obligations while retaining close control over workers (Gereffi et al., 2005; Howson et al., 2022)(Grabher & Van Tuijl, 2020). In other words, they optimise cost-capability ratio for firms through downward pressures on labour (Howson et al., 2022, 2023)

Furthermore, platforms are not only intermediaries in the GPN but also independent value-capturing agents. Primarily, they act as rent seekers, syphoning value from labour transactions through control over production and networks (Howson et al., 2022). As with other platforms, they monetise the intermediation of connections between users: workers and buyers of work. Platforms profit from digital rent by charging for mediation and by collecting vast amounts of data of significant value for speculative markets (Howson et al., 2022, 2023; Mazzucato, 2018).

What does this mean for value-capture dynamics, conceptually? Firstly, they capture value based on two primary mechanisms, arbigration of uneven global labour prices and the extraction of surpluses through the labour process. They leverage their advantageous market position to capture this value, primarily in the form of rent, from both workers and companies (Christophers, 2020; Mazzucato, 2018; O'Reilly et al., 2024). When it comes to types of rents, platforms also rely on rents based on establishing connections between workers and clients, including relational and human resource rents described in the introductory chapter, which designate control over interrelationships in production networks and preferential access to labour. They also profit from infrastructure rents, stemming from their control of digital infrastructures that embody these interconnections. Ultimately, these rents are overlapping, and it is impossible to distinguish them in the case of platforms, as they profit from a monopolising relationship within digital infrastructures. This control over relationships and access to work also gives them high power vis-à-vis the workers and enables them to capture value through

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increasing exploitation in the labour process, fostering flexibility and unpaid labour. On top of externalising the costs of outsourcing to workers, platforms also externalise costs to states by avoiding employment and tax obligations.

Secondly, as explained previously, platforms also set the conditions for value creation. One way in which they do this is that they open up novel markets where previous ones did not exist – by including Serbian software developers in global production networks. They not only incorporate new skills that weren't utilised previously, but they also provide opportunities for workers to appropriate shares of value from the production. Furthermore, platforms reduce transaction costs of different participants by reducing the time for searching for jobs and workers, and instituting trust mechanisms that enable swift transactions. Market infrastructures thus increase market participation, and their algorithms, fed by collectively produced data, optimise the production processes (Horton & Zeckhauser, 2016; Sundararajan, 2017).

The value capture dynamics of platforms could also be seen through the lens of brokerage. On the one hand, platforms can be seen as middlemen brokers in production networks, who control valuable resources and information, making other parties dependent on it and thus extracting rent from this intermediation (Soriano, 2021; Stovel & Shaw, 2012). Thus, for both platforms and clients, the primary interest is the maximisation of surplus value extraction from labour through competition and various management and control mechanisms at the expense of labour (Newsome et al., 2017a; P. Taylor et al., 2013). At the same time, and crucially for the other argument of this chapter, platforms also act as catalyst brokers. These are the brokers that create new interconnections, bridging the network gaps and bringing parties into direct contact, ultimately ending intermediation (Soriano, 2021; Stovel & Shaw, 2012). This distinction between the two types of brokerage is crucial for understanding the dual role platforms played in the development of the Serbian IT sector - both as value capture intermediaries and as strong global network facilitators, whose role might diminish.

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The rise of platform work and online freelancing

Platforms should be seen within the broader dynamics of outsourcing and flexibilisation of labour. With the general proliferation of software development outsourcing in the early 2000s, companies started outsourcing work not only to other companies, as explained in the previous chapter, but also to individuals. This is a long continuation of the flexibilisation of the workforce and the rise of self-employment, particularly in the US and the UK (Kalleberg, 2011; Sennett, 1998; Standing, 2011). These pervasive trends can be seen in the context of post-Fordist economic restructuring, manifested in the decline of long-term, stable employment, the rise of flexible contracts, and deregulation and reductions in worker protections (Harvey, 2018; Kalleberg, 2009). Furthermore, they should also be seen in light of the evolution of remote work and the detachment of work from the workplace (Messenger & Gschwind, 2016). Alongside novel technology, companies restructured their internal processes to accommodate remote work (Flecker & Schönauer, 2016). This way, the spatial configuration of outsourcing became even more complex and dispersed, carried out by fragmented freelancers (Huws, 2014; Lehdonvirta et al., 2019).

The emergence of online labour platforms in the first decade of the 21st century and their expansion after the 2008 financial crisis were key moments for the expansion of online freelancing. Like other digital platforms, they emerged as part of a broader tech boom in that period, driven by low interest rates that led to high tech investment. Furthermore, the platform's popularity was driven by high unemployment and the further fragmentation of employment in this period (Scholz, 2017; Srnicek, 2017). At the same time, novel platform models were exploiting legal gaps by classifying workers as independent contractors (De Stefano, 2015). Ultimately, these platforms made it easy to outsource separate tasks to a large number of freelancers worldwide without the need to formally hire them or set up companies in their countries of origin (Dibbern & Hirschheim, 2020; Manning et al., 2018). Platforms do not

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delegate work; workers apply for isolated tasks. Thus, unlike on-location platforms, workers act as freelancers and are not in an employment-like relationship with the platforms.

Some of the largest platforms by user volume are Upwork, Freelancers, Fiverr, and Guru. These are general-purpose platforms that support many types of work. It is essential to note that highly specialised platforms exist, such as ´Toptal´, that have strict selection criteria and only include the highest-skilled freelancers. These platforms then also provide much higher compensation and high-profile clients. While important for Serbian software developers, such platforms are not as widespread; this chapter will therefore primarily focus on the largest general online platform -Upwork.

Upwork, which this chapter will focus on, is the largest online labour platform by market valuation and user volume.[54] It is a U.S.-based company, founded in 2013 as Elance-oDesk and subsequently renamed Upwork in 2015. As of September 2023, the company's market value is estimated at around USD 1.6 billion. In 2019, the company had approximately 18 million registered workers and 5 million clients across 180 countries. This translates to around 60 million website visits per month on average. Around a third of all jobs posted on Upwork fall under the software development category. Most Upwork clients are U.S. IT companies, including many large Enterprise 300 companies. Most of the freelancers come from India, the US and the Philippines.[55]

For clients or buyers of work, Upwork enables posting tasks on the platform, specifying requirements and defining the price. These tasks can range from small pieces of work completed in minutes to long-term projects spanning months or even years. Together with tasks, buyers of work sometimes also suggest a fixed or hourly price that they would pay for

[54] https://www.upwork.com/
[55] Publicly available data on Upwork: https://www.demandsage.com/upwork-statistics/#:~:text=Upwork%20is%20a%20leading%20global,player%20in%20the%20gig%20economy

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the work. For workers, Upwork enables the creation of detailed personal profiles with outlined skills and previous experience. Workers can choose skills from a standardised list and write extensive, open-ended descriptions. Importantly, workers can set their hourly rates, which the platform suggests to buyers of work.

After receiving applications from work providers, the buyers of work choose among the workers and sometimes even select candidates through interviews. Upwork also provides the possibility to create paid premium accounts for both buyers and sellers of labour. The premium accounts unlock more optimised algorithmic matching. In particular, clients can find the best-fitting workers on the platforms, while workers gain higher visibility and more tailored job offers. Once the parties match, they negotiate the pay. As both workers and buyers of work can set the desirable prices, these prices are subject to negotiation once they communicate after matching.

The role of Upwork does not end with the matching of these parties. The platform provides further management structures that mediate large parts of the labour process, including chat and call apps, as well as a secure payment system. Through this payment system, a fee is automatically deducted from the worker's pay and goes directly to Upwork, as well as from clients. Thirdly, the platforms provide a rating system. Once the tasks are completed, both buyers and sellers of work can rate their experience and leave comments. These ratings translate into a platform reputation that clients see on workers' profiles. The higher the reputation, the more chances workers have of getting job offers.

Expansion of the IT platform work in Serbia

Working through online platforms has become increasingly popular worldwide over the past two decades. Recent estimates from the Oxford Online Labour Index imply that in 2021,

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approximately 163 million workers were registered on online labour platforms globally.[56] World Bank research suggests that this figure can be significantly higher (Datta et al., 2023).[57] Commonly, these workers are located in low-wage economies, while the jobs primarily come from the higher-income economies, primarily the US.[58] The most in-demand skills on the labour platforms fall under the broad category of IT, particularly software development, which accounts for around a third of all jobs on the platform (Datta et al., 2023). This is due to both the high global demand for software development and the high degree of standardisation and codification of this type of work, which makes it suitable for outsourcing (Flecker & Schönauer, 2016). In other words, it is easy to split up software development tasks into smaller pieces of work whose specifications can be easily communicated online.

Serbian software developers found their way to these platforms as early as the early 2000s, when such platforms for software services first became available. As outsourcing companies, the freelancers also recognised the opportunity to plug into newly expanding lucrative global production networks. These were still early platforms or forums such as Rent a Coder. As global demand for software development expanded and platforms grew and entered the mainstream, the number of software developers in Serbia also increased, with many seeking work on digital platforms. In the post-2008 period, early smaller platforms were replaced by platform giants such as Upwork, Freelancer and Toptal.

The number of platform workers in Serbia grew significantly over time, reaching tens of thousands, with most being software developers (Andjelković et al., 2019). In fact, Serbia has some of the highest numbers of online platform workers in the world, not only per capita but also in absolute numbers.[59] This is particularly true in software development, where around 3%

[56] Online Labour Observatory – a project tied to Online Labour Index introduced previously. Available at: http://onlinelabourobservatory.org/paper/how-many-online-workers/
[57] The number of active workers is significantly smaller than the number of registered ones.
[58] Online Labour Observatory. Available at: http://onlinelabourobservatory.org/
[59] Online Labour Observatory. Available at: http://onlinelabourobservatory.org/

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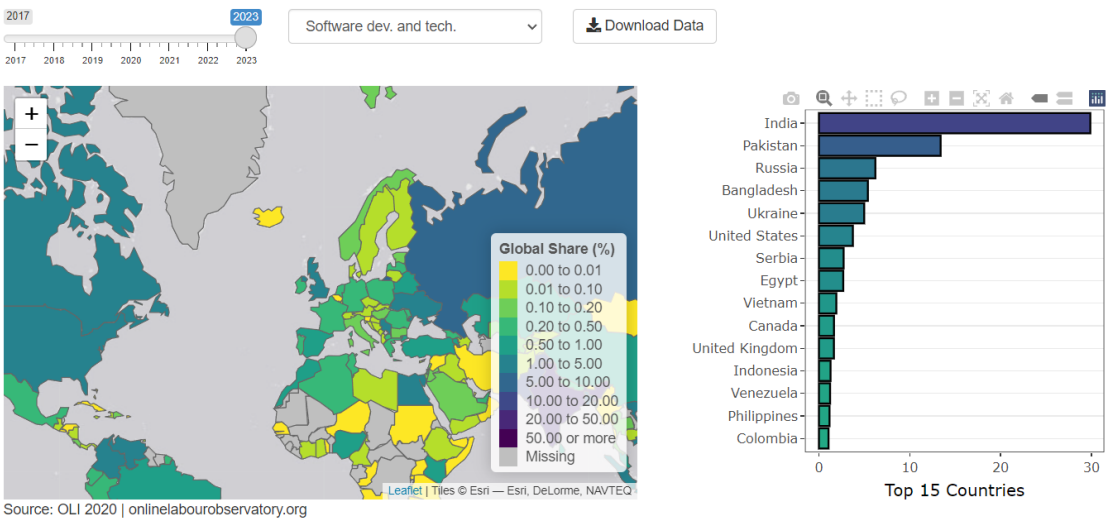
of all software development jobs on major English-language platforms are undertaken by workers from Serbia. To put it in perspective, Serbia has 6.8 million inhabitants, which is barely 0.09% of the global population, making Serbian workers grossly overrepresented on online labour platforms. Serbia ranks seventh in the absolute volume of worker activity in this occupational category, only behind countries with much larger populations: India, Pakistan, Russia, Bangladesh, Ukraine and the US (see figure below), while it is first in per capita terms. The immense relative and absolute size of the platform workforce makes outsourcing through digital platforms crucial for understanding the integration of Serbian software developers into global markets and the value-capture dynamics in the IT sector.

Figure 1. Global distribution of software developers on major online labour platforms in 2023



Source: Online Labour Index, accessed in December 2023

Why were such platforms so popular in Serbia? According to interviews with current and former platform workers, the platforms' widespread popularity stemmed from workers' widespread use of them to work for foreign clients and overcome the lack of opportunities in the local labour market. This was particularly the case in the mid-2000s, at the early stages of IT sector outsourcing to Serbia. During this period, only a small number of IT companies operated in the country, while demand for IT workers was growing in the U.S. and Western

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Europe. As indicated in the previous chapter, salaries in Serbia were exceptionally low at the turn of the millennium, and online work for foreign companies offered hourly wages several times higher than those available locally. Another critical aspect was the low taxation of freelance workers, as well as the tolerance for tax avoidance. As workers either paid no taxes or contributed only small fixed monthly amounts, online work became a way to earn significant net incomes (Arandarenko, 2020). However, over time, platforms also became a source of networks that workers actively used to improve their market positions. This will be discussed in detail later. Another reason for such overrepresentation of Serbian software developers on platforms was that Serbia had a large pool of highly skilled engineers who spoke English but lacked job opportunities, as indicated in the first chapter.

This massive outsourcing of software development through platforms played a crucial role in the ´globalisation´ of the Serbian IT sector. Together with local outsourcing companies and multinational company branches, digital platforms were key actors in the sector's development, bringing together Serbian workers and foreign clients. However, as the local IT sector was developing and companies started offering high salaries and working on more challenging projects, platforms became less attractive in terms of direct economic gain from platform work. Nevertheless, these platforms still played an important role, enabling not only additional income and flexibility but also primarily skill development and international connections. Firstly, due to a lack of knowledge about software markets and trending technologies, platforms provided initial familiarity and skills needed for early entrepreneurship in the sector. Secondly, connections enabled direct access to foreign clients, which later helped found outsourcing companies or find stable remote clients.

Platforms also facilitated online work outside of platforms by enabling the development of relationships between Serbian freelancers and foreign clients who would then move work away from the platforms. This trend became particularly important during COVID-19 lockdowns

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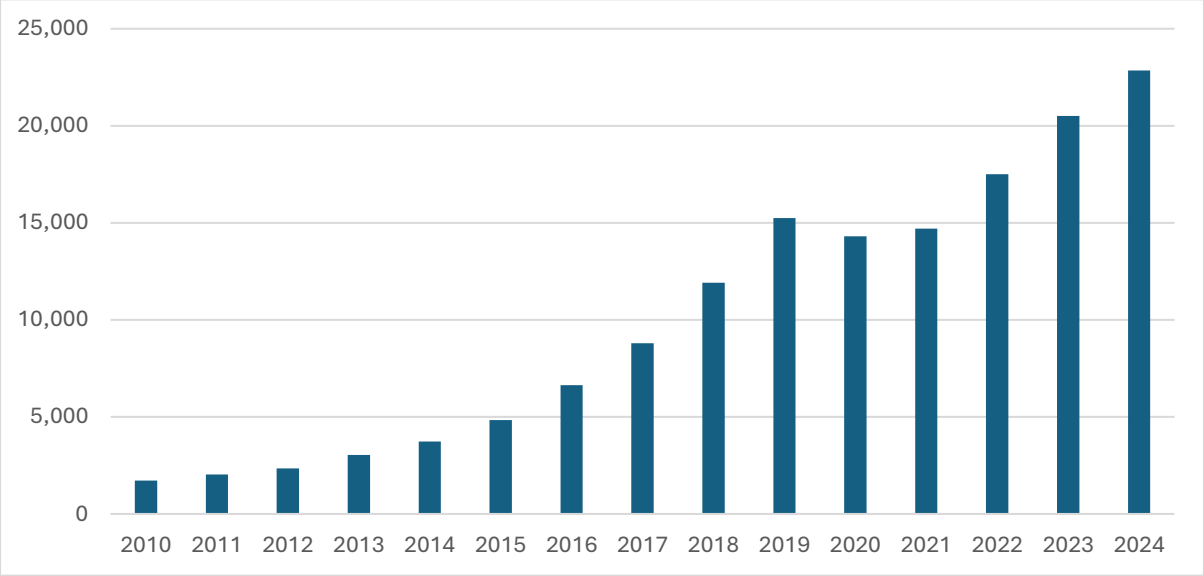
and the broader shift to remote work, with thousands of software developers working remotely for clients abroad (Radonjić, 2022). Ultimately, the number of freelancers within and outside of platforms reached large figures, making up a significant portion of the 24,000 self-employed IT workers in Serbia in 2024 (see figure below).

Figure 2. Number of self-employed IT workers in Serbia through time



Source: National Registry of Enterprises, data obtained in November 2024

Note: This figure includes those working for domestic clients and companies, as well as a significant number of Russian immigrants working as freelancers since the onset of war in Ukraine in 2022. The chapter will not focus on them due to a lack of empirical materials.

Finally, what is important for the context of this chapter is that platform work and freelancing in general have occurred mostly in the grey economy. Most freelancers were not registered as self-employed but worked without legal status. This also meant that they were not paying taxes or social contributions on this income. This lack of legal status and subsequent tax evasion were largely tolerated by the state in the early stages of the sector's development. This can mostly be attributed to the state's general inactivity and weak capacity (Avlijaš & Gartzou-Katsouyanni, 2024). However, this also enabled the free inflow of foreign currency and facilitated the development of the sector at a time of high unemployment and limited opportunities in the country (Arandarenko, 2020). This changed in 2019 and 2020, when the

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government introduced legal changes to curb tax avoidance by platform workers and other freelancers, making them susceptible to significant fines and requiring them to pay back previously unpaid taxes.

In the previous two sections, I contextualised the emergence of online labour platforms and their role in the Serbian IT sector. In the following three sections, I will analyse their implications for value capture dynamics. I will do this by outlining the threefold role of platforms - firstly, as value-capturing rentiers; secondly, as providers of cheap and flexible labour to companies; and thirdly, as catalysts, facilitating connections between workers and companies and leading to networking within the sector.

Platforms as value-capture agents: extraction of rents and enclosure

As argued in the theoretical section, platforms act as rentiers, profiting from ownership of digital infrastructure and data, but also act as anti-markets through the establishment of monopolies. In GPN terms, the platform increases control and coordination in the production networks and provides infrastructures, which leads to a higher value capture (Howson et al., 2022; Sadowski, 2020). To do this, platforms need a consolidated market position that stems from their size and user base. This monopoly is maintained through network effects, or the phenomenon in which the more users the platform has, the more it is worth, and the more it grows further (Srnicek, 2017, 2021). As Upwork is the largest online labour platform in the world, it also attracts new workers and clients because it offers a broader variety of jobs and workers. With a significant user base in place, Upwork profits in a similar way to other digital platforms: through digital rent based on data extraction and ultimately monopolisation of interrelationships between workers and clients. In particular, the platform holds power over workers by controlling access to desperately needed work. Ultimately, Upwork forms a digital

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ecosystem and manages the interactions between buyers and sellers of labour, collects their data, and charges for participation in the network.

The first way Upwork profits is by charging for establishing interactions between clients and workers. For every completed task, the platform automatically charges a percentage of the worker's payment. If workers earn less than $500 from the same client, they are charged 20%; if they earn more, the rate can drop to 15% and ultimately 10%. Clients are also charged a 5% transaction fee. A significant share of Upwork's company revenues comes from charging these fees to freelancers and companies, while the rest comes from premium services described below.[60] Furthermore, workers can apply for a certain number of jobs per month for free, but after that they need to pay for "connections". One connection costs $0.15, and the number of connections needed for the application depends on the job ad.

The fees are a source of dissatisfaction among Upwork workers, often leading them to avoid the platform. Stefan. A 29-year-old software developer who has been working on platforms for several years[61] describes Upwork as "the middleman that takes huge money for nothing." He further explains how the money he earns on the platform is being captured by different intermediaries:

> Imagine I get 100$ for a job. The platform takes 20% right away. Then Payoneer (the payment service) charges me another few percent to transfer this money to my card, after which, the bank takes a huge percentage for the dollar-dinar exchange. So, at the end of it all, I have already lost a huge chunk of what I earned, not to mention the state and the taxes.

Thus, in addition to Upwork's profits, other intermediaries also capture value from platform work.

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[60] Publicly available Upwork data: https://www.demandsage.com/upwork-statistics/#:~:text=Upwork%20is%20a%20leading%20global,player%20in%20the%20gig%20economy.
[61] Interview conducted in August 2023. His statement reflects a general sentiment about intermediary role of the platforms encountered in my interviews.

The second way in which Upwork profits is that it enables premium accounts and services for both workers and clients. For workers, Premium accounts cost $15 per month; for clients, the enterprise account price is custom. In essence, these premium accounts get access to more optimised matching algorithms. For workers, this means better job suggestions and higher visibility on the platforms. Workers can also pay to sponsor their proposals, making them more visible to clients than those of other applicants. For clients, this enables better recommendations or even a handpicked selection of workers, as well as greater visibility for job ads. At the core of the premium account is a more optimised algorithm created through interactions on platforms that generate large amounts of processable data. Through this data, the search mechanisms are then optimised to predict the best matches.

In both cases, the platform charges rent based on ownership of digital infrastructure and the extraction of data (Langley & Leyshon, 2017; Sadowski, 2020; Srnicek, 2021). In the first case, it directly takes income from the workers for the sole purpose of accessing the platform. Having created a monopoly and digital infrastructure that enables workers to access work and clients, labour platforms can charge considerable rents. Users are ready to pay for these rents to access valuable platform infrastructure and data (Birch & Cochrane, 2022). Thus, these infrastructure rents also intersect with relational and human resource rents. However, in all cases, platforms directly profit from the labour that goes into creating data. The data that underpins matching algorithms, premium accounts, and is sold to third parties is generated throughout the labour process, as everything workers do on platforms produces large amounts of data that Upwork collects and structures. However, as workers are only compensated for the jobs they complete, this production of data is unpaid. Thus, apart from direct charges for the use of platform infrastructure, platforms profit directly from the intangible data assets that workers continuously produce (Howson et al., 2023).

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Digital rent and extraction of data, the main profit avenues of platforms like Upwork, depend on maintaining control over all digital interactions on the platform. Because of this, it is imperative to enclose the platforms – make sure that rent is extracted from users and prevent them from exiting the platforms (Sadowski, 2020). To do this, Upwork, like other platforms, prevents independent contact between workers and clients. For example, it tries to prevent typing phone numbers or email addresses in the chat, as well as sharing links to other communication platforms. However, Upwork is less restrictive than some others, as it allows workers to continue working with clients after a certain amount of time spent collaborating on the platform. Some other platforms, like 99designs, do not allow this under any circumstances.

Branislav, a game developer who worked for a few years on Upwork before giving up on freelancing and finding a regular job, explains how certain platforms limit communication with clients[62]:

> You have very limited communication with clients, as platforms try extremely hard not to allow you to share your email address with clients, so they do not contact you directly. Even the voice chat function is limited. This is because they want to keep their monopoly. They are forcing you to use the chat so you don't go with the client outside the platform... In the end, platforms give very little and take a very large part of the total earnings. All the tools they offer, I can get from like five free applications. But you still get more access to clients on Upwork than on some other platforms.

Nikola[63], a web developer working on Upwork, also shares his experience about this limitation imposed by platforms:

> The only reason I am working on platforms is to connect with the clients that would pay decently for my work. But platforms always try to sabotage this contact. For example, Upwork did not allow me to share my email address in the chat to do work outside of the platform. This was very frustrating. But of course, there are always ways around.

The circumvention of platform mechanisms will be described in detail in Chapter 5.

[62] Interview conducted in January 2022. This quote and two other interview quotes below reflect a general frustration with platform mechanisms encountered by platform workers I interviewed.
[63] Interview conducted in July 2022.

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This large degree of control that ultimately translates to a reduction of workers' power and high insecurity is vividly illustrated by Pavle, a senior software developer, working on platforms for over a decade[64]:

> The problem with platforms is that I basically start my business in someone else's space. It is as if I set up a fast-food stand in someone else's yard: they would charge me for everything, and then one day they would come and take my stand. This is how platforms work: they can ban you whenever they want, without any explanation. And they also constantly attempt to prevent you from communicating with the people outside of their chat. For me, this is unacceptable. That is why I just treat them as a way to connect to clients and earn a little bit on the side.

Ultimately, what platforms get from this control over interactions is a combination of human resources, relational and infrastructure rent (Kaplinsky, 1998), ultimately acting as monopolists over interrelationships (Christophers, 2020; Mazzucato, 2018). This is how platforms capture value for themselves. However, their business model depends on attracting clients who pay for work. In the next section, I will show how platforms enhance value capture for these clients through unique platform labour process structuring.

Platforms and the reduction of labour costs

In this section, I show three broad mechanisms by which platforms cheapen labour through the labour process and facilitate the extraction of surplus value for clients while reducing their own costs: labour arbitrage, flexibilisation, and cost externalisation.

Leveraging uneven labour prices, competition and unpaid labour

Platforms enable value capture from uneven global labour prices, but also from the organisation of the labour process and facilitating unpaid labour (Howson et al., 2023). To start with, uneven global labour prices, platforms enable companies to hire workers from regions where labour is cheaper than it is domestically. This way, platforms enable companies to capitalise on the structural exploitation of uneven development and wages. According to the Online Labour

[64] Interview conducted in February 2022

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Index,[65] demand for online platform work in software development primarily comes from high-wage economies such as the U.S., UK, Canada, Australia, and Germany. In April 2024, U.S. clients accounted for around 40% of global demand for software development services on major English-speaking platforms. Conversely, most of the software developers come from lower-wage countries such as India, Pakistan, Bangladesh, Russia, Ukraine, Egypt, and Serbia. India alone accounts for over 30% of the global workforce supply.

On top of labour price differences between these countries, as explained in the previous chapter, the research has also shown significant differences in workers' earnings on platforms (Datta et al., 2023; Lehdonvirta et al., 2019). Workers from lower-wage countries tend to have lower hourly rates on platforms as well, though the differences are not as pronounced as in local labour markets. A quick analysis of average hourly rates on Upwork confirms this trend. Based on analyses of 1000 scraped profiles of software developers from Serbia and 1000 profiles from the UK, I was able to roughly compare hourly rates for platform workers in these two countries. The average hourly rate for Serbian software developers in September 2023 was around USD 33 per hour, while that of the UK developers was USD 48 per hour. Although these figures do not precisely reflect what workers actually earn on digital platforms, the difference in hourly rates is indicative of the worker cost difference between countries.

Apart from enabling labour arbitrage through geographic wage differentials, platforms foster intense competition among suppliers (Flecker et al., 2013). In this case, platforms facilitate competition between workers in the global production networks, reducing their negotiating power and ultimately cheapening them (Howson et al., 2023). The foundation of the Upwork business model is providing clients with access to a large global pool of labour. As already mentioned, the platform operates in 180 countries and has around 18 million registered

[65] Online Labour Observatory. Available at: http://onlinelabourobservatory.org/

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freelancers. At the same time, the platform has only 5 million registered clients who post between 10 and 20 thousand tasks daily. As a consequence, a large oversupply of workers is created. Although software developers can usually earn between $13 and $324 per hour on Upwork, only a minority of them make a living on these platforms. According to one statistic, only 1 out of 800 registered freelancers earns more than $ 1,000 per month on Upwork.[66] This extreme competition for a limited number of tasks reduces workers' negotiating power, leading them to lower their prices and accept worse labour conditions to secure any tasks. This is particularly the case when we take into account geographic inequalities in which workers from less developed countries push down wages. Thus, the companies capture value by taking advantage of uneven geographies not only to hire from low-cost countries, but also to stimulate the global workers' race to the bottom. However, it needs to be said that platforms such as Upwork do reduce the number of workers by removing inactive profiles, as oversaturation with freelancer profiles makes platforms harder for clients to navigate.

In this highly competitive environment, most workers cannot secure a livelihood on platforms, and many quit platform work altogether. Early in their careers, they are driven by the promise of high earnings and career development, only to later find that there is no place for them in the market (Popiel, 2017). This was the case with Nikola, a young, self-taught software developer who worked on platforms to support himself during the early stages of his career[67]. Nikola explains the reasons for quitting Upwork:

> I worked on Upwork for several months, but it became impossible to compete with so many people. I would have to reduce my price significantly to get any job. And people from countries like India were ready to work for so little, sometimes for 20 dollars for two full days of work. I could not compete with that unless I just never moved out of my mother's place. At that time, I needed at least 500 euros per month to survive in Belgrade. Now I need much more.

[66] Publicly available Upwork data: https://www.demandsage.com/upwork-statistics/#:~:text=Upwork%20is%20a%20leading%20global,player%20in%20the%20gig%20economy.
[67] Interview conducted in July 2022. Both Nikola and Milan quotes are representative of a large number of workers who never managed to succeed on Upwork and other platforms due to scarce opportunities and harsh competition

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To stand out among millions of other workers on the platform, people need to have proven skills and work experience on their profiles. Otherwise, they can stay on the platform without ever getting any tasks. Milan[68], an early-career game developer who never managed to build a career on digital platforms, explains how hard it is to compete on platforms:

> It was so hard to show that I am good. I didn't have a great portfolio because I didn't have any previous experience on the platform. It became almost impossible for me to find anything on Upwork, even after trying many times. The first time, in 2014, I held two jobs and earned $100. After that, despite several months of persistently applying, I could not find anything. Then, slowly, I started finding some jobs, but even then, only one in ten clients would respond. And I applied constantly.

Because of this intense competition, workers have to not only put significant effort into building their profiles but also submit many job applications to stand out and land a job. For this, workers need to engage in unpaid labour to gain skills and build a reputation on the platform through good reviews from employers in the hope of finding jobs in the future. This means workers often work for free or at significantly reduced rates (Howson et al., 2023). Unpaid labour, in this case, means paying workers less relative to the total working time by prolonging uncompensated hours.

Oskar, a former freelancer and the owner of the outsourcing company Ribar[69], introduced in the previous chapters, explains the early beginnings of the platform freelancing with his colleagues:

> After registering on platforms around 2005, we soon realised that it was extremely hard to get any job, especially something well paid. Of course, we had to start with miserable work rates to build up our profiles, as we realised nobody wanted to work with us unless we had a track record…We were significantly cheaper than anyone from the US or Europe. At the start, we charged $5 or $10 for projects like website testing. Slowly, we increased our rates to two or three dollars per hour, which was alright for Serbian standards but extremely low for our clients. Once we completed more projects and received positive reviews on our profiles, we were able to significantly raise these rates.

[68] Interview conducted in March 2022
[69] Interview conducted in September 2024

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Vladimir[70], another freelance game developer and former platform worker explains how much unpaid work is done through filtering of workers by employers, but also through investment in personal marketing:

> I would communicate with at least five to ten clients per day. Out of those ten, I would probably speak more extensively with two. But nothing guarantees you a job, as many other candidates are also applying. Because of this, I also had to do marketing management. I had to learn to sell myself and my work by understanding their problems and offering solutions that were better and, importantly, cheaper than the competition's.

He then continues to explain the inequality of access to this platform:

> Upwork is problematic because it is oversaturated. The best ones get the most work. If you are not among the best-rated, you need to set your prices extremely low to get any kind of job. Platforms' rating systems primarily base ratings on clients who buy your work. Thus, if you can't get initial jobs, you are completely invisible to the clients.

Many workers simply give up because they cannot afford to put in large amounts of unpaid work into building a reputation. Branislav explains the unpaid work and undervaluation of work he had to engage in to build his reputation:

> Sure, if I spend six months on the platform just building my portfolio, I can succeed in getting serious clients and achieve a stable income. But someone needs to support me for six months while I'm not earning money, right? And I have to reduce my prices and agree to bad treatment from employers just to get those good reviews.

On the one hand, most workers do not succeed in securing work on digital platforms, while they provide unpaid work to further enhance platform algorithms and increase clients' selection options. On the other hand, a few of those who can demonstrate reputation and skills can secure significantly higher income than in the local labour market. When some freelancers succeed in earning high rates and manage to take advantage of the platform, such 'success-stories' then draw other developers to those platforms as well.

Borislav is a case in point[71]. He has been working in the sector for twelve years and has always had regular employment in outsourcing companies. He is an expert in JavaScript and has,

[70] Interview conducted in March 2022. Vladimir, while succeding to secure clients on the platform for a few years, gave up on platform work due to high precairiousness
[71] Interview conducted in March 2022

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throughout the years, built significant expertise in several of its libraries. Unlike most of the workers I interviewed, he can demonstrate a high level of skills and experience and thus take advantage of the digital platforms. As he explains,

> I just posted that I am an expert in what I do. I think I am the best at doing that particular thing. I was getting many messages inviting me to freelance, join virtual teams, or even join startups. But I refused because I have full-time work and just want something quick on the side. I always tell them I can work either by the hour or by the project. I evaluate the projects and tell them how much I charge per hour and how long it will take.

Borislav further explains that he can secure a much higher income from platforms than from his full-time job at a company, and he also implies ownership and control over his work, which he does not have in his regular job.

> My hourly rates are much higher on the platform than at work, because I can play with them. I choose projects, I get to say how much money I want and stick to that. 'Westerners' don't have an issue cashing out if it's a well-done job. Of course, I can't do that at my company because there are pay grades I can't exceed. I can't be paid 5,000 euros and others find out. Companies don't work that way because people would rebel. But on platforms, it is my work, and it concerns no one.

Large inequalities in job access are also reflected in significant discrepancies in earnings on platforms. Web scraping and analysis of 1000 Serbian software developers' profiles on Upwork in September 2023 reveals significant variation in their suggested hourly rates (See the figure below). Although most of the developers' requests range from $5 to $30, some request significantly more, sometimes over $100. Although these rates are not fixed and can be further negotiated with clients, they imply significant differences in hourly rates across workers. These inequalities are pronounced compared to the salaries in the IT sector, as Borislav also explained in the quote above.

Figure 3. Distribution of hourly rates of Serbian software developers on Upwork ($)

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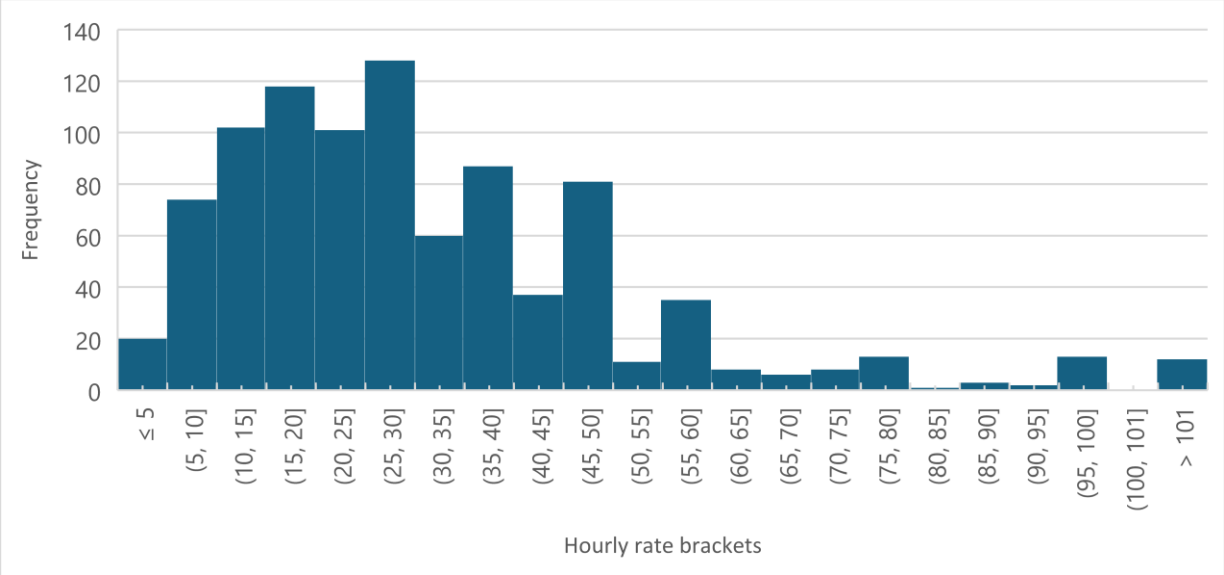

Source: Upwork. Scraped by the author in December 2023.

Ultimately, maintaining an oversupply of labour on platforms increases workers' choice for clients and reduces their negotiating power. Because a minority of workers succeed in getting work, and the majority act like a reserve army of labour, platforms enable clients to extract more value from labour. In line with previous research, platforms effectively lower the bargaining power of workers embedded in uneven geographies and provide asymmetrically greater power to buyers of their work (Anwar & Graham, 2021; Graham et al., 2017; Wood et al., 2019a). Consequently, a small number of high-reputation workers can profit on platforms, while the majority of workers have to struggle to find jobs, while putting in labour the hope of finding high-paid jobs. However, as it will be shown later, this is not the only reason why platforms are popular in Serbia.

Cost reduction through codification and flexibility in platform work

On top of the labour price arbitrage, platforms also enable value capture by making labour replaceable and flexible, in line with perspectives outlined previously that see platforms primarily as tools for flexibilising and precarising labour. As explained in the previous chapters,

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software development value chains are characterised by high task codification and fragmentation, as well as high labour flexibility (Flecker et al., 2013).

When it comes to codification and fragmentation, algorithmic management systems enable Upwork to break complex projects into smaller, outsourceable tasks with a high degree of detail. For example, instead of developing the entire company website, the platforms enable companies to post only a task, such as creating a single button or a webpage tab. This task would be followed by a detailed description and an open communication channel, making it easy for any worker to complete it quickly. This way, platforms fragment jobs into single tasks and make them highly outsourceable, while the client still maintains control over the production process by communicating with the worker.

According to labour process theory, standardised and fragmented tasks reduce the skill requirements of particular workers, making them more replaceable (Gandini, 2019; Thompson, 1990). Most of the work my interlocutors conducted fell into this category. However, this is not to say that all tasks on Upwork are small and codifiable. Interviews also reveal that many freelancers had projects lasting several months, requiring greater skill and closer client contact, although such jobs were relatively rare.

When work is fragmented and easily outsourceable, it is possible to hire workers only for specific tasks without entering a longer contractual relationship. This way, Upwork enables clients to pay workers for completed jobs rather than on a full-time basis. Because work on the platform is based on a piece-rate pay system and workers are not employed, they are also made highly flexible. This means clients can get workers on demand in minutes when they need specific tasks. If they have a larger project, they can hire many workers at once. But as soon as the project is complete, their relationship with these workers ends, and they can downsize the team immediately without consequences. In line with the logic of software development

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production networks, platforms enable flexibility for clients by allowing non-standard employment of workers at the bottom of production networks (Flecker et al., 2013). Platforms significantly increase this flexibility and lead to remarkably high externalisation of labour costs (Anwar & Graham, 2021; Howson et al., 2023). This flexibility is significantly higher than that enabled by the outsourcing companies described in the previous chapter. The number of workers can be easily adapted, easily replaced, and put to work only when needed.

For workers, this high fragmentation and flexibility of work are mostly experienced as precariousness. Interviews I conducted show that workers are in constant search for work, earning irregular income on a piecemeal basis. Branislav is a graphic designer by education who became a game developer. At the beginning of his career, he was seeking to work on platforms to gain more experience in software development and earn higher rates than in the local labour market. One of the main reasons he no longer works on digital platforms is the temporal irregularity of jobs. He explains this in the following way: "A large problem on Upwork is that the tasks you get are completely irregular. One month, there is nothing, then another month I get three or four projects, and I am swamped with work. So, half of the time, I am anxious about finding work, and half of the time I am overworking myself." In his words: "Freelancing is a gamble. You just hope that someone needs you at a particular moment."[72] Branislav's sentiments are also echoed by Stefan[73], another web developer who gave up platforms to get a job in an outsourcing company. Stefan compares this extreme precarity on digital platforms with stable employment:

> I spent months just picking small tasks, hoping to get something decent. And of course, I always had to search because if I didn't, I would be left without any money… When I was working at a company, I had this sense that if one project ended, I would just sit on a bench and take online courses to prepare for the next one. And my money is coming in regularly. That is the difference.

[72] Previously referenced in the chapter. Interview conducted in January 2021
[73] Previously referenced in the chapter. Interview conducted in August 2023

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This irregularity in jobs leads to high income insecurity. Vladimir[74], another young game developer with two years of platform experience, who eventually went on to find full-time remote employment, elaborates on the high insecurity he experienced:

> On platforms, nothing is guaranteed. I can get a job today and earn 200 dollars for a few hours, but that does not mean I will get anything in the next few weeks… At one point, I got into a loop: I had large expenses - rent and bills - and on platforms, nobody guarantees anything. I could always take a break, but I always knew I was broke and had to look for work. I lived like this from one week to another. In the end, I realised that knowing that a wage comes monthly is still better than this life.

Despite extreme precarity, this flexibility was one of the reasons many freelancers started working on platforms in the first place. The freedom to choose working hours and work proved invaluable to many of the people I spoke with. This is one of the main appeals of the platform work and the reason workers stay on platforms for some time. This was especially true for higher-level platforms like Toptal, which indeed enabled greater flexibility and fewer hours of work. However, many got disillusioned with this precarity masked as freedom. In line with previous research, the marketplace power between different freelancers is exceptionally high. While some willingly engage in flexible work patterns with high control over their own work, the majority are forced into a precarious struggle for market survival under high platform control (Au-Yeung & Qiu, 2022).

Vladimir[75], who left platforms for full-time work, explained his initial motivation to work on platforms, mainly revolving around the freedom to choose work and not being forced to follow the dictates of the workplace:

> My main motivation to start working on Upwork was to leave behind nine-to-five jobs where someone would constantly control me and burden me with work I didn't want to do. I also wanted to work from home and be flexible in choosing the work that I wanted to do. I do not want to be a child who sits at a desk and waits for police officers to tell them what to do. I wanted to be my own boss and choose my work. The most powerful feeling was that I could come to an interview with anyone and tell them, "No, I don't want to work on that project, goodbye." That was my biggest satisfaction, because when

[74] Previously referenced in the Interview conducted in March 2022
[75] Previously referenced. Interview conducted in March 2023

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> I was employed, I did not have that option. I was tired of doing stuff that I did not want to do and coming up with solutions that did not work. Here I was freely choosing tasks, and I got a great experience in communicating with clients.

Unlike other previously cited workers, Pavle[76] has significant expertise and work experience, working as a computer science professor, and he is in high demand on the market. Although he did not have to work on the platforms, he did it so for the flexibility it provided. He explains his initial motivation:

> I am working this job mostly because of flexibility. That means I can work an hour or two today, rest tomorrow, and work 12 hours the day after. I simply want to choose when to work and not be obliged to be present at work all the time. I am basically the peasant the state did not manage to put into the factory. I just work when I feel like it.

Ultimately, platforms insert workers in the global market in a way that increases flexibility and externalises the costs to workers. This same flexibility is also the reason why some workers are drawn into this mostly exploitative arrangement. The flexibility offered by platforms enables workers to do the jobs they want at times that suit them, which is attractive to many. However, as previous research also indicates, this flexibility is heavily limited by the structural constraints of platform markets; high earnings are only reserved for a minority, while for the majority, it is experienced as precarity (Schor, 2020; Anwar & Graham, 2021).

Control without ownership: Externalisation of the employment costs

Platforms do not make workers cheaper only through narrowly understood labour-process management, but also through the externalisation of costs and risks onto them and onto the state. This externalisation goes beyond flexibility and unpaid labour described previously. It also relates to the legal status of platform workers. For this, it is crucial to acknowledge that the value-capturing capabilities of platforms do not depend solely on ownership of digital

[76] Previously referenced. Interview conducted in February 2022

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infrastructures, but also on the ability to evade asset ownership, the employer's status and responsibilities coming with it (Grabher & Van Tuijl, 2020; Staab, 2024).

As it has been widely acknowledged (e.g. De Stefano, 2015), platform workers do not have any contracts with clients or platforms, as platforms avoid the status of employers, while clients only pay for single services through platforms. Those working outside of platforms sometimes do get service contracts with the clients. In the Serbian legal system, freelancers have no other choice but to register as self-employed entrepreneurs. However, most of them never registered at all, thereby avoiding the formalisation of platform work altogether. This was due to inadequate legal regulations for freelancing in Serbia, which assumed the reception of money from abroad as a private person at significantly high tax rates, but without any benefits (Andjelković et al., 2019).

What does this mean for platform freelancers in Serbia? Essentially, they have no legal protection from either the client or their state, and no entitlement to any benefits that come with the employment contracts, including holidays, sick leave, or parental leave. Furthermore, they are solely responsible for covering the taxes and contributions. Ultimately, before subsequent regulatory enforcement was rolled out in 2019 and 2020, they mostly operated in a legal grey area, with a lack of employment benefits and either high insecurity from employers or state authorities, or high monetary and bureaucratic burdens. From the client's perspective, this means that they could and still can obtain labour power while avoiding transaction and monetary costs associated with employment and local regulations. More specifically, companies do not have any institutional accountability to labour protections or taxation in the country where they hire labour. This means that they are transferring not only the costs, but also the risks down the production networks to labour.

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This also means that local institutions and laws do not protect online freelancers (Au-Yeung & Qiu, 2022; Graham et al., 2017; Graham & Anwar, 2019; Wood et al., 2019a, 2019b). Online work extends well beyond state jurisdiction, and the working relationship is largely carried out by the buyers of labour (Corporaal & Lehdonvirta, 2024). Even without platforms, self-employment on its own entails numerous forms of insecurities for workers, such as insecure income, lack of employer obligations, and absence of labour protections, while platforms significantly exacerbate these processes.

Freelancers I spoke with are primarily concerned about the lack of protection against employers, but they also worry about compliance issues under the local legal framework. This is also one of the major reasons workers choose to stay with companies rather than work remotely. Firstly, there is a lack of protection from employers, primarily against job security and non-payment. As workers are not formally employed and work on service contracts, clients are free to terminate these contracts at any time and fire workers on the spot. This aligns with previous research on online freelance workers, which shows that a lack of employment contracts and cross-border work lead to abrupt job losses and unexpected contract cancellations (Graham & Anwar, 2019). Filip[77]., working as a freelancer outside of platforms, voices his concerns with the job insecurity he is experiencing: "By working directly for clients, you are throwing yourself into the fire in the sense that if it doesn't work out, you are jobless. You are a service provider, and they don't have any obligations towards you. They can just fire you when they want." Aleksa[78], another freelancer, echoes this sentiment:

> You work from month to month, and you are aware that nothing is long-term with little stability and security...You don't know what your future will be after the next few months. While you are flexible and have good hourly rates, do you really want to search for a new job every month?

[77] Interview conducted in March 2022. He is currently running an outsourcing company which he started by finding clients through his freelance career

[78] An experienced software developer working since the 2000s. He works occasionally as a freelancer, although he also has a regular job. Interview conducted in April 2022.

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In addition to being able to let workers go at will, clients can also easily avoid paying for the work they do. This is a prevalent phenomenon on platforms, where platforms do provide some security for workers, but they are usually known to arbitrate in favour of the clients (Graham & Anwar, 2019; Shevchuk & Strebkov, 2018). Even if workers leave the platforms and secure service contracts with clients, foreign courts are responsible for disputes between clients and their subcontractors, making it extremely difficult for Serbian workers to enforce their legal rights. Aleksa., as several other workers I intervieweed, is concernedwith this legal position:

> The court in London is responsible for that mediation. Will I ever go there and get something for them? No. And the contract I made serves to protect the company… Working with foreign entities is not really regulated, and there are very few mechanisms you can use if someone is withholding funds on the other side. I know several instances from my friends and acquaintances where they were left without payments for several months; clients start being late with salaries, give promises, and then just disappear at the end of the project. And what can you do with them?

Others like Branislav[79] are choosing not to work for platforms online precisely for this reason:

> What do I do if someone doesn't pay for my work? It happened to me in Serbia, and here I kind of know how things work. But what do I do with Americans? I don't know the legal situation or anyone who can help me. Will I really go to US courts over a few thousand dollars?

On top of insecurity, this work also lacks employment benefits. As online workers are not in an employment relationship but are self-employed, they are not protected by labour law. Workers do not have any labour protections guaranteed by domestic law, and they are only paid for their work performance. This is typical of independent contractors who work through service contracts, and their employers are not obliged by local laws as they are outside the country (De Stefano, 2015; Wood et al., 2019b). Although they can secure some benefits through self-employment, such as a pension and health insurance, these are pretty limited and sometimes avoided by workers themselves to maximise their net income. It is often the case that freelancers deliberately sideline employment benefits to secure a higher income.

[79] Previously referenced. He left platform work for a stable employment in game development company. Interview conducted in January 2022.

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Furthermore, for workers, employment benefits appear to be lower on the list of priorities, significantly below income insecurity. As Nikola[80] puts it, "there is a trade off in this kind of work – you are getting a higher hourly salary, but you have no security and protection - you are on your own."

Self-employment and a lack of labour protections also lead to higher rates of labour exploitation and the intensification of work. As workers do not have benefits such as sick leave or holidays, they are incentivised to work as much as they can. As Filip puts it:

> It's very simple: if you don't work, you don't get income, as you don't have sick leave or vacation days. You can ask them not to work on particular days, but they won't pay you. So, you want to work all the time. For me, that meant not taking sick leave or a vacation because I didn't want to lose money… I had a loan for the flat and a baby on the way; at that point, the main priority was to get as much cash as possible.

However, as hinted at in the previous quotes, workers are deliberately avoiding the protections to maximise their incomes. Thus, in the same way platforms attempt to capture value from externalisation of costs, so do the workers. Vladimir[81], who is actually registered as self-employed, but on a minimum rate, explains his lack of interest in social benefits and their role in the labour cost saving:

> I pay the minimum. I mean, I get less for my pension because my base is very small. If I had to pay regular taxes and contributions on this salary, it would reduce it so much…But I really don't care about the pension, the last thing I am relying on is the Serbian state…And I don't want to get a job either, as I would get less money. For the same salary, they would have to add 1000 to 1500 euros just for taxes and contributions.

Therefore, while platforms externalise costs onto workers, many workers are complicit in this. They perceive it is a way to get higher incomes and are often also not interested in most of the benefits. This is partly due to short-term thinking and partly due to the distrust towards the state and its crumbling public services. Thus, ultimately, it could also be argued that workers, together with platforms and clients, capture value at the expense of the state revenues. This is

[80] Previously referenced in the chapter. Interview conducted in July 2025. Nikola left platform work for stable employment.
[81] Previously referenced. Interview conducted in March 2022

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in line with the GPN logic in which peripheral states are continuously disposed of the taxes, although most of the production is happening there (Quentin, 2024).

On top of this, the ultimate way costs and risks are externalised onto workers and the state is through the outsourcing of social conflict. As explained at the beginning of the chapter, in 2019 and 2020, the state-initiated legislation to prevent further informal freelance work for foreign clients and to introduce substantial fines for freelancers. This had significant negative consequences for freelancers, leading to large-scale protests against the government. This will be elaborated in detail in the next chapter. Here, it is crucial to outline this cost externalisation.

Freelancers like Ivan[82] are deeply troubled by this legal insecurity: "We are already insecure with foreigners and now we are additionally insecure because of our own state…" They are mostly worried about the hefty fees they would have to pay to make up for past non-payments. Ivana[83], another freelancer, for example, decided to end her freelancing and migrate to Austria due to this legal insecurity:

> This was the last drop for me… We just couldn't live in a situation where everything is insecure. We asked three or four different accountants and multiple tax authorities about this, we got different information from everyone, even from different tax authorities. And ultimately, it depends on who the inspector is and how they will understand and implement the law. So, it can be this or that way. It was so stressful… it was probably the main reason why we decided to move.

Some local commentators and sector experts point out that this form of freelancing practically represents value capture at the expense of the state. According to an academic researcher and taxation expert who was involved in the regulation, "The Serbian state was practically subsidising the IT sector by looking away from this tax avoidance."[84] According to his paper, such workers were regularly employed; they would not only pay higher income taxes but also

[82] Interview conducted in April 2022. Ivan was a freelance worker working outside digital platforms, working directly for US and European clients

[83] Interview conducted in May 2022. She worked for a local IT firm before finding a freelancing arrangement. However, after several years of freelance work as self-employed, she decided to migrate to Austria and find regulare employment there.

[84] Interview conducted in October 2021

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generate positive economic spillovers for the companies they work for. From the state perspective, this form of outsourcing could be said to hinder the development of the domestic economy, as it deprives it of an acutely needed workforce (Kostić, 2020). Thus, platforms can be seen as depriving local companies of the ability to capture value. The same sentiment is shared within the industry, as they are struggling to get enough labour. According to a representative of an IT cluster[85], "There is a large human capital loss with seniors working remotely. Firstly, schooling is a huge cost for the country, yet nobody considers the outflow of value. These people could be pulling the local sector and creating value here, instead of elsewhere". Thus, in line with the conception of the state's role developed in the introduction, the state did play a significant role in the sector's development. This was not done through conscious developmental policies, but rather through the absorption of outsourcing costs. However, as the sector matured, such support proved counterproductive to development. Further discussion of the struggle around labour and broader developmental issues will be explored in Chapter 5.

Online platforms as both middlemen and catalysts

What are the broader value capture implications of platforms, then? As demonstrated in the previous sections, the platforms act as rentiers and as labour providers. The platforms profit from rents based on ownership of digital infrastructure and interconnections between workers and clients. Furthermore, through the structuring of the labour process, platforms enable clients to hire cheaper labour through the immense flexibility of workers, global competition, the race to the bottom, and unpaid work in building the platforms' reputations. At the same time, they are externalising most of the costs of outsourcing to workers and the state. However, it is important to acknowledge how platforms also create value through this intermediation process.

[85] Interview conducted in March 2022. The interviewee coordinates a regional cluster bringing together more than 20 regular member firms, employing over 8000 people

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Platforms manage to externalise almost all costs and risks associated with production, including ownership of physical assets, training, and regulatory and tax compliance. This way, they maximise the cost-to-capability ratio for themselves and the client companies, thus capturing more value (Howson et al., 2023). Due to the lack of formal presence of platforms in Serbia and the tax evasion by platform workers, the state's minimal tax revenues (C. Quentin, 2024). Furthermore, there are very limited spillover effects on the sector or the local economy in general, but only an outflow of labour, the implications of which will be explained in subsequent chapters.

From the labour perspective, only a minority of workers can make a living on platforms, while most serve as a reserve army of labour, resulting in very limited value capture for workers. But why are platforms so popular then? And why do I claim that they are important for the Serbian IT sector? For this, it is necessary to look at the enabling role of platforms. As explained throughout this chapter, workers willingly entered the platform arrangement in the hope of benefiting from it. In the early days of outsourcing in Serbia, platforms enabled significantly higher earnings for workers, enabling them to leverage uneven geographies, despite the difficulty of getting work. However, the rising salaries in local companies and the emergence of online work outside of platforms significantly reduced this incentive over time. Nevertheless, a significant number of workers manage to earn a living through platforms. Another key motivation for workers to join platforms is greater flexibility and autonomy, though, as shown in the previous sections, while attracting many freelancers, this appears more like precarity for the majority of workers. Furthermore, the possibility of earning income without paying taxes, at least until the regulation change, enabled workers to capture more value at the expense of state revenues, making it one of the reasons to engage in freelancing.

This is a part of the broader enabling power of the platforms. As mentioned previously, platforms contributed to market creation, connecting workers with foreign clients, developing

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a previously nonexistent sector. They provided matching algorithms and reputation mechanisms that facilitated this process, ultimately enabling value generation and opportunities for workers to capture value from this intermediation as well. Platforms provided a jumpboard for workers to take advantage of uneven geographies and interconnections to capture value for themselves, thereby playing a significant role in transforming the Serbian IT sector. From the GPN perspective, platforms enabled the integration of Serbian software developers into global production networks, in a context where local IT workers and companies had limited global market access and lacked direct ties to foreign clients. This initial integration happened at the point of fulfilling simpler, fragmented tasks, but still provided a basis for further development and multiplication.

The concept of brokerage is useful in explaining these processes. While the broker middlemen's role on the platforms has already been demonstrated, they also need to be seen as catalysts (Stovel & Shaw, 2012). In the early stages of the IT sector, platforms served as catalyst brokers, bridging gaps in networks because ties did not exist between local IT workers and foreign companies. Platforms reduced transaction costs and information asymmetry, providing instant connectivity between labour supply and demand (Howson et al., 2022). In other words, catalyst brokers weave together production networks where previously no connection existed. These connections are essential as they enable circumvention of the local labour market with fewer opportunities. This is where the value creation role of platforms comes into play – they enabled creation of previously unexisting markets and reduction of transaction costs for different actors involved, thus facilitating broader value capture.

However, their role is not limited only to initial facilitation, but platforms also provide interconnections, cutting themselves off from the outsourcing processes. From an economic rent perspective, platforms were losing the monopoly over the interconnections embedded in their digital infrastructures, despite their significant efforts to enclose both workers and

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companies within them. Over time, workers began working directly for clients, ousting brokers or becoming brokers themselves and starting outsourcing companies. Furthermore, they were used to learn fundamental skills and to better understand the software development market. Once that function was achieved, platforms lost their initial purpose. Thus, as one expert in the sector commented, the platforms were acting as 'flow boilers' of work, leading to development and globalisation of the sector. In terms of rents, the platform's ability to capture digital rents, which combine human resource, relational, and infrastructure rents, sharply declined due to market competition once workers and companies found ways around them (Kaplinsky, 1998). This is a specific trait of brokerage rents, which are transient, unlike other, more durable forms of rent associated with property ownership (Cristophers, 2022). This further illuminates the temporary nature of value capture in production networks based on brokerage rents in the expanding markets.

These processes played a key role in further anchoring outsourcing in Serbia as workers used such catalyst brokerage to actively transcend the boundaries of local markets. And this was not simply about earning higher rates than in local markets, as argued by previous literature (Graham et al., 2017; Lehdonvirta et al., 2019), but about disintermediating from platforms and dictating value capture on their own terms. Firstly, the workers used platforms to engage in cross-border work outside of platform mediation, effectively working full-time for foreign companies without legal representation in Serbia. This enabled workers to earn higher rates and avoid oppressive algorithmic management, thus actively capturing more value from their work. These processes will be further described in Chapter 5. Secondly, and more importantly, workers used platforms to find companies that would later become customers in their newly established subcontracting companies, as was already explained in Chapter 1. Thus, platform intermediation should be understood both from the perspective of value capture and value

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creation in this context. The next chapter focuses on these subcontracting companies, through a case study of Zvezda, also born out of platform mediation.

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CHAPTER 3: VALUE CREATION AND CAPTURE THROUGH INTERMEDIATION: THE ROLE OF SOFTWARE SUBCONTRACTING COMPANIES

This chapter continues the analysis of the sector's integration phase. While the previous chapter analysed outsourcing work to individual workers via online platforms, this one explores a different form: outsourcing to IT subcontracting companies. Conceptually, the latter represents a more advanced form of outsourcing than freelancing, enabling more local value capture opportunities (Aridi et al., 2021). It fosters the development of local companies and industries and offers regular employment for workers, which contrasts sharply with the piecemeal rates individuals earn through platforms. Still, as will be shown later in the chapter, this value capture has significant limitations.

By subcontracting companies, I understand those that do not make and sell their own software, but instead develop, test, or rework software or provide labour for third-party clients (Hirschheim et al., 2009; Matijević & Šolaja, 2020, 2022). Such companies are the backbone of the Serbian IT sector, driving its growth since its inception. While platform outsourcing and subcontracting emerged simultaneously, I have discussed platforms first. This is because platforms played a significant role in the early phases of the sector and contributed to the rise of many outsourcing companies, but later diminished in importance as the need for brokerage declined. Whereas subcontracting companies became the leading players and the fastest-growing segment in the Serbian IT sector, employing over 80% of workers and accounting for 70% of export revenue (Matijević & Šolaja, 2022).

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While still primarily providing labour and acting as intermediaries in the production networks, subcontracting companies manage to insert themselves into production networks, capturing a significant share of value locally. Such companies manage to anchor work in the country by competing globally for projects, employing thousands of people, and even upgrading to higher-value activities, as demonstrated in subsequent chapters. However, as this chapter also shows, such value capture remains mediated by labour provision and is transient due to competitive pressures in production networks.

The main goal of this chapter is to I explain key value capture dynamics in the sector through subcontracting companies. I am moving beyond previous research that has demonstrated how position in a production networks shapes working conditions, to developing a more dynamic perspective centred on value capture. Primarily, I will outline different ways in which these companies capture value - while lead client firms capture value by reducing their labour costs, outsourcing companies do it through different kinds of rents as intermediaries, based on preferential access to labour and clients, but also through extracting surpluses in the labour process. Conversely, I show that as platforms, companies not only capture but also create value through intermediation processes. Furthermore, the economic rents they capture are transitory and erode due to competition, primarily from foreign companies entering the market in search of cheap labour. Finally, I show the limits of such an outsourcing model, leading to limited value capture opportunities in terms of broader economic development.

In the first section of the chapter, I will outline the guiding conceptual framework. Next, after drawing links to the previous chapter, I explain the landscape of outsourcing in Serbia from the mid-2000s onwards, situating it within broader global trends and the wider context of Eastern Europe. Then, I will introduce the case study of Zvezda, a prominent Serbian subcontracting company, to illustrate the value-capture mechanisms described above. Lastly, I explain the changing dynamics of value capture and market consolidation. I base this chapter on available

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online materials, interviews with the CEO and workers at Zvezda, as well as insights from personal interviews with managers and workers from other outsourcing companies.

Global production networks, economic rents and surpluses

Most literature on global production networks has focused on the structure of interfirm relations within production networks and how these relations determine value-capture opportunities. This has brought important insights into the mezzo-level dynamics of the global production, by asking and answering the questions of how firms are governed, how they can capture value, and what the consequences of this are for local economic development.

This literature distinguishes between different types of relations between companies in the networks. The two main models that IT companies engage in are captive and relational models (Feuerstein, 2013; Flecker & Schönauer, 2016; Gereffi et al., 2005). Captive centres are branches of multinational companies located in offshore locations and owned by their core companies. These companies are fully integrated into the operations of one multinational company, working on its products and services, and primarily serving to access labour and reduce costs. In IT outsourcing, large multinational software product companies usually prefer this hierarchical captive model (Flecker & Meil, 2010). Sometimes these captive centres carry out simpler labour-intensive stages of work, while other times they conduct more complex design, research, and development activities (Boes & Kämpf, 2007; Flecker & Schönauer, 2016).

In contrast, offshore subcontractors, guided by the relational models of network interconnections (Coe et al., 2019), are independent outsourcing companies competing for projects from multiple clients. Such relational companies vary, including prime contractors or system integrators that coordinate the work of multiple suppliers for clients; specialised providers that deliver high-value, specialised software; custom software development

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companies that complete entire software projects for clients; and staff leasing companies that rent workers to clients (Yost, 2017). These models imply different value-capture trajectories: system integrators and specialised suppliers operate at higher ends of networks and capture more value than staff-providing companies that act as lower-level subcontractors. Such subcontractors are more commonly used by non-software lead firms, although they can also be found in software firm-led networks.

As already mentioned above, this chapter focuses exclusively on subcontracting companies for several reasons. First, these companies provide much deeper insights into the dynamics of outsourcing in the country. Captive centres primarily act as cost-reduction branches governed by lead firms, following the simple logic of obtaining qualified labour at a lower price. In contrast, subcontracting outsourcing companies, rather than acting as mere branches, compete in the market for clients and pursue distinct value-capture trajectories and market strategies within global production networks. Furthermore, subcontracting companies exhibit a significant transformation potential, as they can upgrade to different types of outsourcing outlined above and capture more value in the process. These are the processes described in more detail in Chapter 4. Finally, by focusing on a subcontracting model, I can follow the trajectory of a domestic IT company over an extended period, whereas obtaining such information from multinational product companies would be much more difficult. Nevertheless, captive centres will be mentioned later in the chapter.

The relational model is crucial for understanding the position of subcontracting companies and their business models. Staff augmentation, the primary focus of this chapter, is an arrangement in which a subcontracting company leases workers or teams to clients for a fixed period. This was the most common model at the onset of the Serbian IT industry, and it remains highly relevant in the sector today. This is a non-specialised type of outsourcing with a lower level of complexity, requiring a generic set of skills that can be split into work packages and outsourced.

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This makes suppliers or subcontractors of such work more replaceable than specialised suppliers with unique skills and client relationships (Feuerstein, 2013; Flecker et al., 2013; Flecker & Meil, 2010; Flecker & Schönauer, 2016). Thus, these companies have weak negotiating power in GPN and use a brief window of opportunity to become intermediaries and capture rents in the outsourcing process (Hardy & Hollinshead, 2011; Herod et al., 2007).

Understanding the interfirm dynamics and the position of subcontracting companies through this framework is crucial for studying value capture. However, such a traditional GPN approach does not account for the key focus of this research and the primary source of value in the outsourcing industry - labour. Despite the usefulness of this inter-firm approach, as outlined in the theoretical section of the introduction, the approach has been criticised for being too firm-centric and insufficiently focused on labour. In particular, since it is assumed in the GPN theory that value ultimately comes from labour (Coe & Yeung, 2015), several authors have argued that research should also increasingly focus on workers and how value is captured in the labour process itself (Bair & Werner, 2015; Newsome et al., 2017a; P. Taylor et al., 2013).

Research on the software sector has also demonstrated the importance of focusing on labour by examining how IT companies' positions in the value chain shape the labour process and, in turn, influence working conditions. For example, research by Flecker et. al. (2013) has shown that service value chains, though highly diverse, tend to modularise and codify work, externalise employment, and combine co-operation with competition in ways that intensify managerial control, fragment labour, and limit workers' collective power. Other research has shown how captive and relational models in production networks shape the labour process in different ways, as firms translate their pressures from production networks onto the workforce (Feuerstein, 2013). Research conducted in countries like Ukraine or India has also shown how similar subcontracting outsourcing companies that are highly mobile, cost-driven, and weakly

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embedded in the local economy, also translate into precarity for workers (Hardy & Hollinshead, 2016a; Noronha & D'Cruz, 2016).

I build on these previous insights, but I also go one step further: I disentangle different ways in which value is created and captured and analyse its dynamic nature. I will analyse the value-capture dynamics in the sector by outlining key sources of value and the main types of rent companies accrue. Furthermore, I show that value-capture possibilities are transient and erode due to competition.

The chapter is organised around two key ways in which value is created captured in outsourcing: labour price arbitrage and labour process. Firstly, I show how companies capture value based on intermediation in uneven geographies and tax regimes, but also how they create value in the process. Due to uneven development and various historical, economic, and political factors, workers' compensation differs across countries, firms capture value through uneven global labour prices. As the labour is relatively immobilised within country borders, capital can move freely, particularly in software development, taking advantage of these low labour costs (Amin, 2014; Roy, 2017). This not only means that the lead firms capture value by outsourcing to Serbia through reduced labour costs, but also that outsourcing companies in Serbia can capture a share of this value by brokering between lead firms and labour. However, value capture does not occur solely at the expense of the net wages that workers in different countries receive, but also at the expense of low differential tax rates (Quentin, 2024). These tax rates also shape the differential cost of labour.

Secondly, subcontracting companies are also capturing surplus value within the labour process (Newsome et al., 2017a). According to the labour process theory, companies capture value from workers through different managerial strategies, including flexibilisation and labour cost reduction (Newsome et al., 2017a; Riisgaard & Hammer, 2011; P. Taylor et al., 2013). This

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way, companies earn over and above what they would have otherwise simply by increasing the extraction of value from labour by optimising the usage of labour power. However, this is simultaneously a value creation processs as firms also train labour, organise I, thus increasing overall productivity being more than simply a collection of outsourced individuals.

The concept of economic rents is helpful to account for different mechanisms of value capture through preferential market position, but also for their transitory nature. Namely, as described in the introductory chapter, quasi or dynamic rents (Kaplinsky, 1998, 2019) provide temporary value capture for companies based on asset ownership or a preferential market position, until eroded by competitors seeking to profit from the same rents.

Firstly, like platforms, subcontracting companies accrue human resource rents. They earn profits above normal levels due to their privileged access to labour. Since initially, very few foreign companies in Serbia were competing for labour, which was exceptionally cheap, local outsourcing companies could charge premium prices due to their privileged market access (Kaplinsky, 1998). Secondly, and relatedly, in the context of Serbia's relative isolation and limited network interconnections, these companies also profited from relational rents, as they had privileged access to client companies abroad (Kaplinsky, 1998). The derived rents came chiefly from the ownership of contracts with exclusive access based on connections and trust; this usually enables future contract wins (Christophers, 2020; Mazzucato, 2018). Third, firms may also seek to capture institutional rents, as some benefit from certain policy rules more than others, including lower taxes, preferential treatment by the state, and different regulatory loopholes (Kaplinsky, 1998). On top of these rents, companies also capture value through the extraction of surpluses in the labour process, though this could be better understood in terms of normal capitalist profits.

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Importantly, as platforms, despite being primarily intermediaries, outsourcing firms are not only extracting value, but also creating it. Firstly, as elaborated throughout the thesis, a large portion of these companies proactively found and brought in clients to Serbia, multiplying local market and creating capital out of thin air – enabling growth of the sector, and value capture opportunities for both workers and the state in a previously non-existing market. Furthermore, these companies were not only acting as intermediaries extracting value from labour – they train workers, organise them and coordinate the work – ultimately increasing the productivity and reducing transaction costs. Thus, their business model is not ultimately purely extractive, but they should also be seen through the lens of value creation through intermediation, similar to platforms described previously.

In the first part of the chapter, I provide historical context for outsourcing in Serbia and the emergence of subcontracting companies, before deep-diving into an analysis using this conceptual framework.

Emergence of software development outsourcing in Serbia

The proliferation of outsourcing of software development in Serbia, starting in the mid-2000s, coincided with the global surge in demand for software development and the massive relocation of work on a global scale, as explained in Chapter 1 (Manning et al., 2018). The geographic expansion of production networks enabled companies at the top of these networks to maximise value capture through cost reduction and its externalisation to suppliers and labour (Flecker & Schönauer, 2016; Hirschheim et al., 2009; Wolff, 2016). Importantly, the expansion of networks opened up space for subcontracting firms in lower-cost locations, such as Serbia, to capture value by providing labour to clients. The IT sector in Serbia expanded from the mid-2000s onwards, primarily driven by the outsourcing model, which leveraged the availability of cheap, skilled labour. The local outsourcing companies were primarily providing services to

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foreign companies, not to domestic ones. The main reason for this was, and still is, the weak capacity of domestic companies and their low level of digitalisation, compared to companies in the West with large software budgets.

The expansion of software development outsourcing in Serbia was linked to outsourcing in other Eastern European countries, including Russia (Biagioli & Lépinay, 2019), Ukraine (Hardy & Hollinshead, 2016a), Poland (Medve-Bálint, 2024), and Romania (Guga & Spatari, 2021). Outsourcing in these countries focused on providing labour to U.S. and European companies and followed a similar trajectory - developing in the mid-2000s and then continuously expanding, with some fluctuations caused by demand shocks (Guga & Spatari, 2021; Kleibrink et al., 2018; Matijević & Šolaja, 2020; Živković et al., 2018).

However, there were significant differences in Eastern European countries. Russia initially mainly operated as an outsourcing destination, but later largely shifted to producing its own digital solutions due to the vast size of its market (Biagioli & Lépinay, 2019). Other Eastern European countries, more integrated with Western European markets, such as the Czech Republic, Estonia, and, to a lesser extent, Poland and Hungary, developed more product-oriented companies due to better access to capital and markets (Medve-Bálint, 2024). However, countries like Ukraine, Romania, Bulgaria, and Serbia remained primarily in the outsourcing model(Matijević & Šolaja, 2022).[86] According to interviews conducted, the outsourcing model dominates in Serbia due to a small, underdeveloped local market and a lack of capacity to sell products internationally, forcing the entire sector to focus on providing labour and services to foreign companies.

As explained in the previous chapter, the proliferation of outsourcing represented a rebirth of the Serbian IT sector. While it existed on the economic margins at the turn of the 21st century,

[86] Start-up Genome and Emerging Europe reports: https://startupgenome.com/report/the-global-startup-ecosystem-report-2024/introduction; https://emerging-europe.com/it-landscape-report/

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the sector became one of the country's key economic pillars only 15 years later. According to some estimates (Matijević & Šolaja, 2022), the sector grew by around 15% on average each year in both employment and income since its beginnings. The growth occurred in line with the constant global demand for software developers, driven by the sector's predominant orientation towards providing services and workers to foreign markets. In 2023, the sector reached over 100,000 employees and exports worth more than €4 billion, making it one of the most valuable exports in the country. The sector primarily grew through outsourcing and provided significant value-capture opportunities for local outsourcing firms.

Going back to the sector's beginnings, around 2005, the sector began major integration into global production networks. At this stage, local companies began working with companies abroad, and some foreign companies opened offices in Serbia. While developing slowly, in the brief period between 2005 and the 2008-9 financial crisis, the sector's total estimated value doubled, reaching EUR 545 million (Mijačić et al., 2011). During this period, a large number of outsourcing companies were founded, most of which have come to dominate the Serbian IT scene to this day. This included numerous subcontractor firms, as well as key captive companies such as Microsoft. As argued in the previous chapter, Microsoft acted as a facilitator of the broader internationalisation of the sector through the influx of foreign companies and clients (Ilahi et al., 2019). Other captive foreign companies followed soon.

Many subcontracting companies emerged in this period. In the same year, a Dutch nearshore software outsourcing company, Levi 9, opened an office in Novi Sad, Serbia, and started hiring software developers for Dutch clients.[87] Hundreds of smaller companies also started operating then, such as Quantox Technologyin 2006 in Cacak.[88] In 2008, some of the largest outsourcing

[87] https://www.levi9.com/about-us/
[88] https://www.quantox.com/about

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companies in Serbia were also founded – HTEC[89] and VegaIT[90] Starting with a small number of employees, the companies grew, and the employee numbers reached over a thousand in the post-COVID-19 period. Importantly, most of these outsourcing companies initially operated through a staff augmentation model and later expanded to other outsourcing models.

As the software development business model is characterised by low barriers to entry (Yost, 2017), the sector was in its early stages, and founding an outsourcing company was exceptionally easy during this period. Due to possibilities of remote communication and coordination, Serbian firms were able to find clients globally and plug into global production networks without developing a local IT ecosystem (Avlijaš et al., 2023). As per one major outsourcing company founder, "You could start a company with a friend in a flat; it was so easy, demand was great, and there was no competition. That is why it was so huge."[91]

In addition to these new outsourcing companies, existing local product-oriented companies also continued to expand rapidly, only to be acquired by multinational companies. As mentioned in Chapter 1, some companies, such as DMS, operated in Serbia throughout the 1990s, particularly those associated with universities, such as FTN Novi Sad. In 2008, French Schneider Electric bought a local software development company, DMS, affiliated with the University, to become one of the country's biggest IT companies. The company was developing software for optimal management of electric energy distribution, employing hundreds of experts, many of whom were affiliated with FTN.[92] RT-RK suffered the same fate of acquisition and together with DMS became the largest IT companies in the city. Many other companies emerged from FTN more or less directly. According to a professor from the FTN and one of

[89] https://htec.com/
[90] https://www.vegaitglobal.com/
[91] Owner of a smaller outsourcing company, operating for more than 10 years. Interview conducted in February 2022
[92] According to interviews and news sources such as: https://www.ekapija.com/news/1178554/windows-fuer-verteilungsnetzbetreiber-schneider-electric-dms-ns-erzeugt-beste-softwares-fuer-die

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the early IT entrepreneurs, this period was characterised by parthenogenesis - the splitting of existing companies around the university into new ones. First, the university staff started opening companies, and then students started the same from 2006 onwards.

This early expansion was briefly interrupted by the 2008 global financial crisis, the effects of which were felt in Serbia as early as 2009. During this period, demand for services and software developers was plunging, and many clients went bankrupt, unable to pay for the IT services they had received. In this period, the sector value dropped by 22% to EUR 424 million in 2009. Furthermore, investments in the sector also dropped by around 20% (Mijačić et al., 2011).[93] However, the decline was short-lived, lasting up to half a year. As companies in Western Europe and the U.S. engaged in cost-cutting after the crisis, work was increasingly being outsourced to lower-cost locations, including Serbia. A key factor enabling the expansion was quantitative easing by central banks and a large inflow of cheap money into the tech sector, leading to an explosion in the number of startups and venture capital investments, as well as the expansion of technology companies in general. Furthermore, digital transformations intensified in traditional industries (Srnicek, 2017; Staab, 2024). This is the context in which Zvezda, a company case in focus of this chapter, emerged.

Zvezda and the subcontracting business model

Zvezda[94] had a humble beginning. It was founded in 2008 by two young and enthusiastic software engineers. As the IT sector in Serbia at that time was underdeveloped and access to clients was limited, it was only accessible through personal connections. Zvezda founders got their first work through two common client sources at the time – online labour platforms and

[93] Also, per the calculation of Milos Matijevic, key researcher on the sector. Available at: https://pcpress.rs/comtrade-gde-je-srbija-na-tehnolokoj-mapi-evrope/

[94] The description of the case study based on publicly available information, including news articles, podcast interviews, a biographical book written by the company owner, as well as an interview conducted with the company owner conducted in May 2022.

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university connections. Firstly, as described in the previous chapter, like many software developers at the time, these two students turned to online work platforms. There, various clients from all over the world posted work for which freelancers like them could apply. The platforms enabled direct contact with employers abroad, enabling access to work and higher salaries than those offered locally. Apart from gaining clients they worked with for a longer time, according to the Zvezda owner, the platforms enabled them to gain serious experience not only in coding but also in other business areas such as marketing, negotiation, and communication. Secondly, as for many generations of software developers in Serbia and Novi Sad, the initial point of contact with global markets was the Faculty of Technical Sciences in Novi Sad. After seeing their talent in an international programming competition, the professor recommended these students to a smaller outsourcing company developing software for a client in the Netherlands.

This early freelance work enabled them to gain experience and build a number of international clients. When the global software development industry began rapidly expanding, they started their own company and took their work off the platforms and away from this outsourcing arrangement. This was a common dynamic that I will explore in more detail in the next chapter. To start a company, they gathered an initial capital of 4,000 euros to pay for the workspace in a rented apartment and the basic equipment needed for work. At first, they worked alone, but as they expanded, they began paying for additional engineers through these freelance projects. After only a year of work, the 2009 crisis hit the IT sector hard. However, while the 2009 crisis was a temporary setback that led to a short-term loss of projects for the company, several months later, the projects returned in greater volume.

Initially, the company provided software developers for projects it received from other software development companies in the Netherlands that acted as system integrators or prime contractors. The final clients were usually Dutch non-software companies, such as banks or

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telecommunication companies, that needed software to digitalise and optimise their business processes. Their partnering software companies, for which they acted as subcontractors, were larger and had stronger references, which enabled Zvezda to secure work. At that time, Zvezda offered only engineers, including the founders, as they were mostly in demand for staff augmentation agreements or for renting out individual developers to other companies for a specific duration. These developers would then work on third-party projects, sometimes with the third-party team, sometimes with a team built by Zvezda.

In the words of the company founder and CEO of Zvezda, written in his biographic book from 2024[95]:

> For a long time, clients did not know Zvezda ever existed…We were second-hand in the (outsourcing) process - meaning that some other company from abroad gets the job and then subcontracts part of that job to us. Sometimes we were a third link in the chain, and sometimes even fourth…. There was no chance that a large bank, a telecommunications company or a media company would give us a project worth millions of euros. We did not have good references, we could not secure bank guarantees, and we did not have the knowledge and experience needed to provide quality in completing the projects (author's translation).

Over time, the company expanded significantly and began providing services to clients across industries, primarily in the U.S. and Western Europe, and also moved to higher-value activities. It secured a few contracts directly with its main clients, no longer playing exclusively the role of a subcontractor, while also developing its own digital products. Subsequently, the company reached over 1000 employees in 2024, becoming one of the major software development outsourcing companies in Serbia and the broader region. All of this development was based on the expansion of their staff augmentation model, which is pervasive in the Serbian IT sector and will be described below. Furthermore, the company still retained this model as one of its core services. This is why the chapter will primarily focus on this model, due to its relevance for the company and the sector as a whole.

[95] The book is not linked due to anonimity concerns.

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The company's staff augmentation model includes providing different kinds of engineers, such as web, embedded, mobile, data, DevOps, but also other profiles, such as quality assurance, project managers and business analysts. Zvezda and other outsourcing companies rent out either individual workers or whole dedicated teams of experts, or simply provide services per working hour. Therefore, their main source of revenue is the difference between what clients pay for workers and these workers' salaries in Zvezda.

Staff augmentation is the company´s core service and occupies most of its website space. This is illustrated by two prominent advertisements on the company´s website:

> Extend your in-house capability by adding a few engineers. Or, spin up a whole product development team. Our dedicated development teams adapt to your needs. Whatever it is, we've got the specialists to bring it to life. Sometimes you need a self-managed software engineering team to drive your success. Other times, you just need a little extra capacity. We do it all - blending with your team to give you the skills and capability you need to succeed. Show us your dream and we'll build it with you[96].

On the same website, the company illustrates how labour sourcing works after the company applies for projects. Firstly, Zvezda has a conversation with clients to determine their labour needs. Zvezda then does an internal candidate selection and sends their CVs to the client. If the clients are satisfied, they have interviews with the candidates or directly start working on a project.

The labour-sourcing procedure is further described by workers at Zvezda, who regularly switch projects. Krstan[97], a software developer who worked in the company for three years, explains:

> In most cases, clients ask Zvezda for a certain number of people they need for a project and their profiles. Other times, our architects estimate the number of human hours required for certain projects and the number of people needed. The estimate is never exact, so 1000 human hours can be either 800 or 1200, so the project's length is not fixed. Then Zvezda selects available workers and sends their CVs to companies, and

[96] The website is not linked due to anonimity concerns.
[97] Krstan is a medior software developer working in Zvezda for three years at the time of the interview. Interviews conducted on several occasions, starting from August 2023. He was working on three different projects in terms of organisational structure.

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> the companies pick and choose. If the client picks you, you go for an interview where you have a call, send them some previous work and pass a technical test.

He continues to explain how the workers are integrated into the client's projects:

> The team structure on the projects is always different. Sometimes it is just you, or a few of you from Zvezda, who are assigned to a client team. Then you get their manager, who is in charge of you for the next period…So your raise and everything depends on their feedback and how much they are paying you. Sometimes the client rents an entire team from Zvezda, so you get a Zvezda manager instead. On one project, I was with four people from the company; on another, with two; and on the third, I was alone. And we are mixed with people from other outsourcing companies, as well as some freelancers who provide B2B services.

This is a standard staff augmentation model applied across the companies I researched, in which workers are mainly perceived in terms of human hours. This conceptualisation further reflects their interchangeability and disposability and literally presents value as pure labour hours[98]. Other outsourcing arrangements are more complex and require greater expertise and coordination. In custom software development, Zvezda and other outsourcing companies provide a software solution or parts of one to the client, rather than simply renting workers. In end-to-end outsourcing services, the focus is not only on developing custom software but also on providing the full software development lifecycle, including analysis, planning, design, development, testing, deployment, and maintenance. These models are considered to have higher value added, as they do not involve simply renting workers but also require specific expertise in project delivery, for which outsourcing companies can charge more than the sum of working hours. Nevertheless, despite these differences, all these models, including captive centres of multinational companies mentioned above, ultimately revolve around the provision of labour for foreign companies. In this chapter, I focus on analysing the staff augmentation model, while in Chapter 5, I explore other forms of outsourcing, again through the case study of Zvezda.

[98] This is the most common outsourcing model I encountered in interviews with firms and workers referring to earlier phases of sectoral development. Per available evidence,such arrangements are still dominant in the sector.

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Value capture through labour price arbitrage

As argued in the introduction, outsourcing firms act as brokers, both creating value through intermediation and also using their position to capture value by mediating between foreign companies and workers in Serbia, based on labour cost differences. As in other forms of outsourcing, cost reduction is a key driver for software development outsourcing. After all, the primary motivation for client companies to outsource software development is that it can be done more cheaply than in-house. Thus, to maximise value capture, they need to maximise the difference between what they get for workers and the salaries they pay them (Dedrick et al., 2011; Flecker et al., 2013; Hardy & Hollinshead, 2016a; Hirschheim et al., 2009; Wolff, 2016). This is due to high labour intensity in the software development industry, where key expenses are tied to labour costs (Mazzucato, 2018). This is also acknowledged in writings on the Serbian IT sector, where labour is widely seen as the main resource and source of value (Matijević & Šolaja, 2020a, 2022).[99]

Accordingly, Zvezda is basing its business model largely on low-cost developers. On their website, the first benefit they list as a reason to hire their company is cost reduction:

> Cost reduction. First things first! Everyone who thinks big considers the budget needed for the services that can take their whole business to the next level. When it comes to reducing costs, the most important thing is knowing how to cut them in infrastructure and salaries. After all, this is in everyone's best interest, wouldn't you agree?[100]

On top of providing relatively cheap labour for foreign clients, outsourcing companies also aim to pay workers less than they charge clients, profiting from this mediation. An owner of a smaller subcontracting company I interviewed explains how this mediation works:

> Outsourcing companies introduced a new business model to the Serbian IT industry: they sell you to the client. These companies started earning way more than they paid

[99] Andric (2023). Srbija i tehnologija. Da l ije buducnost IT sektora u radu za strane kompanije ili u originalnim proizvodima. BBC News Srbija. Available at: Srbija i tehnologija: Da li je budućnost IT sektora u radu za strane kompanije ili u originalnim proizvodima - BBC News na srpskom

[100] Website not linked due to anonymity concerns

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> the workers. So, these companies act as proxies, selling workers to clients and taking their piece of the cake. That is how Zvezda and other companies got rich[101].

In this case, the role of IT supplier outsourcing firms can also be understood through the framework of labour intermediation and brokerage, which explains how companies act as value-capturing intermediaries between global firms and local workers. Outsourcing companies occupy a gap between clients and developers, connecting two otherwise disconnected groups and enabling them to control the flow of information, resources, and opportunities (Koster & Van Leynseele, 2018; Soriano, 2021; Stovel & Shaw, 2012; Xiang, 2007). Rather than simply functioning as employers, these outsourcing firms broker access to labour and clients, acquiring labour cheaply and selling it to clients at a higher price.

Where does this cheap labour, essential for the value capture by both client and outsourcing companies, come from? The first half of the answer is uneven global labour prices, partly influenced by differential tax rates. Companies were able to capture so-called human resource and relational rents by having exclusive access to a pool of cheap labour and to clients abroad, effectively acting as brokers. Furthermore, they profited from institutional rents, enabled by low taxes and regulatory loopholes, which allowed them to provide labour at lower cost than competitors in other countries. The final component is the extraction of surpluses through the labour process. These processes will be analysed in the subsequent sections. On top of value capture considerations, I will also show how these firms create value in the process.

Labour cost arbitrage as modus operandi

It is a general rule that firms in high-income economies source suppliers from regions where labour is cheaper, thereby capturing value based on the structural exploitation of uneven geographies. In the literature, this process is often referred to as labour arbitrage. It can be

[101] Interview conducted in March 2022. He was running an outsourcing company for 6 years at the time of the interview, while he was working a sa developer several years previously as well

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defined as the savings an organisation makes by hiring labour where it is cheaper than domestically, or by paying one labour pool less than the other for the same work, based on geographically uneven labour prices (Hardy & Hollinshead, 2016b). As argued, in the software development industry, this meant that companies from the U.S. and Western Europe massively outsourced work to countries like India, the Philippines, and Eastern European countries with low wages and skilled workforces (Aneesh, 2006; Hardy & Hollinshead, 2016b; Upadhya, 2016). While the labour price differences during the 1990s and 2000s were immense, these gaps reduced over time (Yost, 2017). The implications of this phenomenon will be discussed in the upcoming chapters.

Before explaining key value capture mechanisms based on price differences below, it is important to highlight that as platforms, outsourcing firms are also creating value through intermediation. Being fueled by the price reduction motive of the client firms, they are actually expanding the markets in Serbia, reducing transaction costs for involved actors and opening up opportunities for value capture not only for lead firms, but also for workers and ultimately the state through taxation (although price of labour is reduced through regressive taxation as it will be shown in the next section.

As explained in the first chapter, labour prices in Serbia are lower than in Western and Central Europe due to historical factors that have shaped the general price of labour and the cost of living. Looking at the price of labour in 2025 on one of the most popular job-seeking portals for software developers, the average annual gross salary for a software developer in the UK is EUR 57,200, and in the U.S., it is EUR 147,200.[102] These are two of the major client countries of Serbian companies, including Zvezda. In contrast, the average annual salary of software

[102] Indeed is one of the most commonly used sources for estimating IT salaries across the world. Available at: https://www.indeed.com/career/software-engineer/salaries

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developers in Serbia is estimated at around EUR 30,000.[103] Therefore, labour costs in Serbia are 50% to 80% lower than in these countries.[104] Of course, these differences changed through time. While in the early 2000s this difference was several times higher, the gap between salaries in these countries and Serbia is shrinking over time, though it remains significant.

While these labour price differences enable cost reduction for lead companies that outsource, they also enable value capture for local outsourcing companies like Zvezda. This calculation of uneven labour prices was what Zvezda and other outsourcing companies based their business model on. Furthermore, in the early phases of outsourcing in Serbia, they had preferential access to cheap labour without much competition, being able to capture human resource and relational rents discussed in the introduction.

These companies charged U.S. and Western European companies prices based on their standards, while paying wages in line with local standards that were still above the local average. As the company´s CEO explains in the interview[105]:

> Our country was not known for high-quality IT companies or experts in this field. What we had, however, was technical universities creating great engineers, and compared to other countries, we were selling our services relatively cheaply…When I talk with people from companies abroad, I often hear that Serbia offers an excellent price-to-quality ratio for labour, which they can get from companies like Zvezda.

This general trend of companies from "the West" outsourcing to low-cost destinations is also reflected in the projects Zvezda works on. Other subcontractors working on the same projects are also usually from Eastern Europe or other low-cost destinations. Krstan[106] explains the

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[103] Helloworld is the most comprehensive database of IT sector salaries in Serbia. Official statistics do not provide sufficinetly disagregated data for software (only for ICT in general) and do not provide information on the seniority of workers and different profiles. Available at: https://www.helloworld.rs/plate/software-developer-u-beograd

[104] This is an estimated average salary of software developers regardless of seniority. The figures for early years of outsourcing are unavailable.

[105] Interview conducted in May 2022

[106] Interview conducted in August 2023. Previously referenced.

labour price differences in subcontracting and outsourcing arrangements based on his experience:

> I know how much a developer costs in the UK and how much I get; this difference is enormous. So, you are just collecting crumbs below the table, although you are still well paid for Serbian standards, so you have to be satisfied…. For example, the client in the UK I work for now is another outsourcing company that develops products for the client. From what I know, they (a UK software company) charge the client around 50 euros per developer per hour. Then they take additional developers from Zvezda and charge around 30 euros per developer per hour to join their team. And then Zvezda gives me slightly more than 10 euros at the end for my work. So, I do all the work, but I get 20% of what the original client paid for me after the companies take their cut.

Thus, while the workers are aware of this cross-border arbitrage, they still participate in the value-sharing from these arrangements, as they receive wages above local wages. This topic will be elaborated on in Chapter 4.

Labour price arbitrage is a structural feature of outsourcing. As the manager of another Serbian subcontracting company, Vuk,explains[107], workers in Serbia are cheaper, and they simply have to be if these companies want to secure work:

> We always have to be competitive in the global market. For example, a senior developer in the U.S. costs between $120,000 and $150,000 per year. For one U.S. company to even consider hiring people from Serbia who are in a different time zone, have different cultures, weaker English-language skills, and untested skills, these workers simply need to be cheaper. The cost cut needs to be significant. I think we need to be at least 30% cheaper than they are to even be considered for outsourcing work. Ten years ago, our senior developers were only 10% as expensive as U.S. developers. Now they are closer to 50%, so it still pays off for them. But if these prices come too close, they will never take us.

According to interviews with managers, the price per hour for developers they charged their clients was usually set in line with the rest of the market in Serbia, but also in accordance with what they knew about prices in Eastern Europe[108]. The price was usually what clients were willing to pay. Occasionally, they managed to charge more. According to Oskar, owner of an

[107] Interview conducted in February 2022. Vuk has been one of the early software entrepreneurs, running an outsourcing firm since 2012

[108] Answers in interviews with company managers owners when I asked about how the price was determined.

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the company Ribar mentioned previously[109]: "We charge 40-50 euros per hour, as that is the standard outsourcing fee. Some companies with a better reputation can charge more, but this is the standard. We always try to adapt to the market in Serbia and the neighbouring countries, but sometimes we just say a higher figure and take the work if they accept it."

Most of the workers in outsourcing companies I spoke with also actively reflect on their positions in these cross-border labour-sourcing arrangements. Krstan[110] from Zvezda explains his view on the value distribution in outsourcing:

> In outsourcing, you are selling your own time. They just rent you out to the client; you do whatever you are told, and then you pick up the crumbs of your own labour. You don't have anything to do with your company, and you are just borrowed for a definite period. And I always have this bitterness and dissatisfaction in my head, as you know, both Zvezda and other contractors are earning much more than you get. But that is common for outsourcing.

Veljko[111], another worker in Zvezda, has a similar calculation:

> My hour is charged to the clients at €40, which means €6,400 per month. And my salary is €1500. So you can see the difference. But it is still better than the first company, where they charged €5,000 per head per month and we got a salary of €700. And if I want a raise, they say 'yes' - but only if the client agrees to pay more for me; they have to always keep their profit margin. Of course, the company has many other expenses to cover. However, most of these expenses are our salaries. When the crisis started (during the pandemic), we asked management if we could contribute to savings to avoid layoffs or salary reductions. One manager literally said that – ′you can turn the lights off as much as you want, but your salaries are 90% of the expenses'.

While labour arbitrage is indeed at the core of the company's business model, calculations such as those made by Veljko do not fully reflect reality. The gross expenses for workers remain significant, including taxes, contributions, vacation days, sick leave, business trips, and conferences. On top of that, income from developers is used to pay for non-developer roles, including HR, marketing, design, and business development. Therefore, the company does not earn several times over from workers; labour costs are indeed its largest expense. In the words

[109] Interview conducted in September 2024
[110] Interview conducted in August 2023
[111] Another medior software developer in Zvezda. He has worked in Zvezda longer than Krstan, 5 years at the time of the interview

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of a prominent researcher on the IT market in Serbia: “Most of these companies are practically staffing agencies. They simply budget people. When you look at balance sheets, most of their expenses are just salaries”[112].

However, ultimately, companies such as Zvezda capture rents based on the monopoly over interconnections and unique access to cheap labour in Serbia.

Taxation and the state cost absorption of outsourcing

On top of gross wage differences, workers in Serbia are also cheap due to taxation: regressive taxes and tolerated tax avoidance. This means that value capture by both the client and outsourcing companies happens at the expense of the potential state revenues. While still falling under differential global labour compensation, it is important to acknowledge that companies capture value over and above what they would pay in taxes in their home countries or other locations. This could be characterised as the institutional rent introduced above. By this logic, workers also participate in this value capture, as their net incomes are high precisely because of lower income taxes and tolerated tax avoidance. This way, taxes act as a mechanism for redistributing value within production networks, not only to companies but also, arguably, to workers, happening at the expense of the state.

As explained in the previous chapter, the main hallmark of the Serbian tax regime is its low progressivity (Aleksić & Arandarenko, 2022). The main burden on wages is social contributions, which are fixed, while income taxes are flat at 10%. Furthermore, for very high wages (5x the average), which are primarily found in the IT sector, social contributions are no longer paid. Thus, the Serbian taxation system is designed to heavily burden low-wage workers while benefiting software developers with high wages or those who hire them (Aleksić &

[112] Interview conducted in December 2024. This expert has been researching IT sector in Serbia since the 90´s, providing market analysis for industry and policymakers

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Arandarenko, 2022). Because of this, companies like Zvezda can pay their workers more in net terms than companies in most of Western Europe with comparable gross salaries. For example, if a software developer's gross salary in Serbia is EUR 5000, the worker would receive a net salary of €3528. In contrast, in Germany, the same worker would get 3032, while in the Netherlands, 3264.[113]

Furthermore, primarily until 2021, firms and individuals in the IT sector enjoyed implicit favourable tax treatment. Since the Serbian tax regime allows lump-sum presumptive taxation for entrepreneurs/self-employed (Aleksić & Arandarenko, 2022), many workers and entrepreneurs in the sector benefit from this fixed, relatively low tax rate, which is particularly beneficial for high-income earners. It enabled hidden employment or false self-employment in high-wage sectors, which, through lower taxes, made Serbian IT workers globally competitive (Arandarenko, 2020). Similar schemes were also available to outsourcing companies in countries like Ukraine (Hardy & Hollinshead, 2016b). According to interviews with various company managers and owners, it appears this was a common practice advised by consulting firms. The owner of one IT subcontracting company explains how this worked in practice[114]:

> That was the standard practice. People were sitting in companies and were de facto monthly invoices to employers rather than just having a salary and a labour contract. The math is very simple. You register as an entrepreneur and pay fixed taxes and contributions of around €300 per month. So, it doesn't matter how big your tax base is. So, everything you earn above that is your net, pure plus. That is what the companies were doing. There were companies with 200 workers, but only 20 employees…
>
> And the companies had their appetites. They had their target profit margins and wanted to maximise gains by taking the most profitable path. So, they instructed the workers to switch to 'pausal' (self-employment) so they could save on taxes and social security while still paying high wages to the workers. So, they were like "You know, you cost me 2000 euros per month gross. Do you want me to employ you for that amount, and you are left with 1100, or I give you 2000 euros on pausal, and you pay your contributions for 300 euros, and keep the rest?" And that was a no-brainer - everyone opted in for that… We can pay people more, people are happier, and they are leaving less. And some companies simply didn't have a budget to hire developers legally. So, it's not only about profiting more but merely being able to afford workers as they get more money…This way, local outsourcing

[113] Estimated using online net salary calculators.
[114] Interview conducted in February 2022

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companies can then compete with large companies like Microsoft. In a sense, they can pay wages that are roughly comparable to those of someone with a high budget working legally.

According to the CEO, Zvezda is one of the few Serbian outsourcing companies that has not used this employment model. The reason might be that the salaries in this company are comparatively low and that they would not save much under the self-employed model. Still, workers from Zvezda who came from other outsourcing companies, such as Veljko[115], have experience with being fake self-employed:

> I was registered as self-employed and got paid by the company as a service provider. That was a common practice across companies until 2020, when the state regulated it. That meant I paid minimal taxes while getting much more cash. It was good for the company and for me. The only problem is that we would have very little left for the pension…but who cares about that when they are 24?

Thus, in addition to human resource and relational rents, subcontracting companies also captured institutional rents.

Value capture through the labour process

Outsourcing companies are not only labour brokers that profit from uneven geographies. They are companies that manage labour, support workers in skill development, and provide quality assurance for their work. At a higher level, they also absorb all employment-related risks and costs, including regulatory compliance. Thus, these companies are not only sums of individual workers they rent out as platforms, but they also do the management work (Fisher et al., 2009). Skilling workers and performing quality assurance are important parts of what outsourcing companies do, and this is where they differ from platforms that simply provide individual workers. This has important implications for value capture: the subcontracting companies also add value to the outsourcing process.

At the same time, the managerial processes in these companies also serve to maximise the extraction of value from workers. These workers are not only cheap because labour prices are

[115] Interview conducted in August 2023

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unevenly determined by living costs, salaries, and taxes, but also because of efficient management. In this section, I will focus on value capture through the labour process. I will primarily discuss two key mechanisms that optimise the use of labour power - the flexibilisation of workers and HR processes. Firstly, while there are different ways of extracting surplus value through the labour process in the IT sector, direct Taylorist control, common in manufacturing industries, is less frequent here. Instead, this is done through the flexibilisation of workers to maximise their capacities and performance monitoring with greater autonomy in the labour process itself (Feuerstein, 2013). Secondly, to understand surplus value extraction, it is not sufficient to examine only everyday managerial practices; broader HR practices related to hiring, training, promotions, and firing workers must also be considered (Feuerstein, 2013). In this subsection, I show how companies extract surplus value from labour and ultimately capture organisational rents through these two groups of strategies.

Optimisation of work organisation and flexibilsiation of the workforce

Flexibility is the principal hallmark of outsourcing in the software development sector. Due to the high standardisation and codifiability of software development work, as well as fast-paced developments in the sector, this work is extremely mobile across geographies and nodes in global production networks (Flecker et al., 2013). For the supplier company, this means constantly adapting to a changing market to secure projects and meet diverse client demands. This includes organising labour so that it is provided only when needed, thereby preventing disruptions and keeping costs low (Flecker et al., 2013). Flexibility and replaceability of labour enable lower costs for both clients and outsourcing companies, thereby acting as value-capture mechanisms.

This translates to the labour process through the functional, numerical, and temporal flexibility of workers. Functional flexibility refers to workers' adaptation to different tasks, numerical flexibility to the quick adaptation of team sizes, and temporal flexibility to their ability to adapt

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working times to projects (Flecker et al., 2013). What these three types of flexibility enable is the high mobility of workers between and within projects, thereby optimising production costs and organisational efficiency (Hardy & Hollinshead, 2016b).

When it comes to functional flexibility, in general, companies at the bottom of production networks, such as Zvezda, prefer hiring generic engineers who are *specialised in everything*. Due to the rationalisation of the labour process, these engineers are just replaceable units whose work is measured by the time they put in, rather than by specialised knowledge in a domain (Upadhya, 2016). As a consequence of functional flexibility, or the standardisation of tasks and the training of workers, workers also become more replaceable and ultimately create downward pressure on wages (Flecker et al., 2013; Thompson, 2010). This means that flexibility also translates into the cheapening of labour described in the previous section. Furthermore, the standardisation of work tasks in global production networks ensures that worker departures do not disrupt projects. That is, workers who leave the company can always be replaced by new workers (Feuerstein, 2013).

Dragan, a junior quality assurance engineer[116], explains how work on projects from different industries plays out from the worker's perspective, specifically, automated quality assurance:

> I work on very different projects across the healthcare, logistics, architecture, biotech, e-commerce, education, and insurance sectors. I have to adapt to different industries and learn on the job. I need to get into the shoes of a user to test that every part of the app works well. None of us is a domain expert; we just have to improvise. It is impossible to specialise; it doesn't work like that in our company. Zvezda can't offer you the opportunity to develop your skills and work as a domain expert, as it all depends on clients and projects. So, it's not worth spending months learning a framework or language; it is a waste of time, since you won't use it, and the knowledge will evaporate.

[116] While Dragan is a QA engineer, and not asoftware developer in a strict sense, the versatility and flexibility of work is comparable to interviews with software developers I conducted. Interview conducted in August 2023

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However, the company does not only have to adapt to different industries but also to different projects, which might require significant adaptation on the worker's side. Srdjan[117], who left the company partly because of this excessive flexibility, elaborates:

> Zvezda cannot really always choose projects; they take what they can. So often, we get low-quality projects with a lot of legacy code that nobody in the West wants to do. You just patch up someone else's poor work. So, people are assigned random projects and have to do many diverse things without ever becoming experts.

Although in principle, workers are asked about working on particular projects, there is always a risk of being replaced if they are not flexible. Krstan explains this in detail[118]:

> If you are choosing projects, you won't be able to advance, and you might even get fired. In principle, if you are a junior, you should accept everything; otherwise, you will be perceived as unreliable. Especially now with the crisis in the market, you are more easily replaceable than before.

The workers are not only supposed to be able to adapt to different projects, but also to enter and exit them at any time. This numerical flexibility is important because software outsourcing companies are constantly upsizing and downsizing their workforce in response to clients' demands (Aneesh, 2006; Flecker & Schönauer, 2016). This aligns with the conceptualisation of workers as interchangeable in terms of working hours. According to Zvezda´s website: "Recruiting takes time, and you need people who know what they are doing right away. Staff augmentation helps you fill in the skill deficiencies, take care of fluctuating workloads, or tackle seasonal demands."[119] This is why the company keeps a large ´bench´ or reserve pool of workers ready to jump on the project at any time. According to the CEO: "To be interesting on the market, we need to have a sufficiently large bench. This number is usually between 10% and 15%. This way, we can relatively quickly create a team for the client."[120]

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[117] Srdjan was included to also represent a large number of workers who left the company. At the time of the interview, in September 2023, he was already out of Zvezda for around year and a half
[118] Interview conducted in August 2023
[119] Website not linked due to anonymity concerns
[120] Interview conducted in May 2022

Veljko[121] explains this numerical flexibility from the worker's perspective:

> Clients constantly change their demands for workers. So initially they ask for one number, but then if they need to speed up something, they ask for more people, or if they have a smaller volume of work, they take fewer people. So, on the project I am currently working on, there were five of us, three developers and two testers. After a few months, they only needed four of us, so one guy left the project and was reassigned to another. Two weeks ago, they had some financial problems, and they said they only needed one developer, so I was the only one left to finish the work we'd done, but we stopped making new stuff. So, they change team size very quickly.

In the context of other outsourcing companies (Hardy & Hollinshead, 2016b; Upadhya, 2016), including in Serbia, numerical flexibility is often achieved by hiring labour on temporary contracts, who can be hired or fired at low cost and with minimal obligations for the company. In contrast, Zvezda has created a relatively stable workforce, but it has developed mechanisms to efficiently allocate them to projects. Workers who are currently not on the projects are put on the 'bench'. Veljko explains how this works:

> The bench means you are sitting on one side, still working eight hours, and receiving a regular salary. But you are an expense for the company, as they are paying you out of their own pocket since you are not working for a client. So they want to put you on a project as soon as they can. When you are on a bench, you are learning new technologies. When they have a client for you, they are preparing you for that work. But if you are on a bench for too long, that is a problem. You don't have any grounds to ask for a raise so that you can stagnate.

This way, workers are made flexible to move from one project to another. As Veljko explains it:

> I was constantly changing projects and jumping in and out…Although it is very stressful and annoying to change all the time, you also learn more than in a product company, where you do the same thing. But anyway, it is not for the long term, I can't take it for a long time.

Work in software development also entails a fair amount of temporal overlap across projects, necessitating what can be labelled temporal flexibility. As companies like Zvezda have hundreds of projects with different clients, the workload is usually not evenly distributed across time. To function effectively, companies need to manage workers so that their time and labour

[121] Previously referenced: Interview conducted in August 2023

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are optimally used. This can be done through flexi-time, where workers work as long as possible to finish projects and then rest on the other days. High pressure occurs at specific points in the project cycle as deadlines approach. In Zvezda, this is not very common. However, project cycles are marked with periods of high-intensity work, and vacation days are all aligned with client needs. On other days, workers may experience very little work.

I had my first call with Veljko a few days before he left for vacation. That was his first seaside holiday in several years. The reason for this is that in previous years, the project deadlines overlapped with his desired vacation times and were neither approved by management nor by the clients. Veljko lists causes for this:

> From the client side in outsourcing, you are a rented-out labourer who is fairly paid for. That means they can request your work whenever. So I was on constant projects, and I couldn't take a vacation for a year because I had to be there for the clients. So every time you request time off, the client also has to approve it, so you are at their mercy. This summer is the first time I am going to the seaside since I started working. So if you are four people, they expect you to work for eighteen people when there is a deadline. Plus, they just give you whatever their developers don't want to do, so you have to handle impossible things. So there is a huge difference between you and the client's people; they have some protections, but you don't. The stress is enormous, and the client shows zero regard for you.

Dragan[122] also speaks about this uneven distribution of work throughout time:

> In September and October, I had a horrible period, and I was close to burnout. I wanted to quit or take medical leave. It was very hard to learn and dig new things under such tight deadlines. I lie down and dream of work. No matter how hard you try, it is not possible to do it in eight hours … But sometimes I work only 3 hours per day effectively when there is no work. So, it depends, and you can never predict it. It all depends on the clients' wants, and they very frequently change plans. So, we don't often work overtime, it is just very intense during work hours.

Ultimately, flexibility serves to optimise labour organisation, extract more surpluses and make labour cheaper.

[122] Previously referenced. Interview conducted in August 2023

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HR processes and creation of cheap labour

In the early stages of outsourcing, Serbia had abundant, cheap software developers, and the general labour market price was low. Over time, the Serbian market has become saturated with companies, making it increasingly hard to find cheap labour locally. However, Zvezda manages to employ hundreds of workers at low cost without significant issues, with average salaries lower than those at other major IT companies in the country.[123] This is the case because Zvezda is not simply following the market flows but is instead 'creating' cheap labour through efficient HR management. The CEO of Zvezda explains this process in the interview in detail[124]:

> We do not have a significant problem with it [labour shortage]. Last year, we hired 400 people, 400 engineers who are said to be extremely scarce on the market. And we hired as many in our sister and daughter companies. When people say there are no engineers, they mean there are few experienced seniors who you have to overpay, way above the market value. And before that, they were also overpaid when they were hired so that companies could snatch them from the competition. We don't focus on them. We are building this company in the long run...
>
> If today we hire 10 or 100 people straight from university without experience and invest in them, in 3, 5, or 7 years they will be the same people who are said to lack on the market and don't exist. So, we create what we need, while most other companies struggle to hire already moulded developers.
>
> I will give you an example: one former client contacted us as they wanted to open an office in Belgrade and asked us for advice…Their main question was: "How were you able to give us developers for 45 euros per hour on our projects? When we do any calculations here, it is impossible to do it that cheaply in Serbia. Our logic was that if we pay you that much, you must have a margin of 15-20% so it can be done cheaper if we open a development centre in Belgrade and do it ourselves"….So that is the problem foreign companies face – they come here and realise they screwed up and that their expenses are much higher and keep growing as people demand higher and higher salaries.

He additionally elaborates:

> The IT market has significantly grown, but the number of top engineers has remained the same. It is a pure demography. It has little to do with the quality of education or anything else. Those who are not exceptionally talented are still motivated to learn and work. And most of them will do a good job. Some of them are not developers in the sense that they are extremely passionate about this job and that they have done it their

[123] https://www.helloworld.rs/plate
[124] Interview conducted in May 2025

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> entire lives. Then, the task of companies like ours is to recognise that and invest enough in them so they work well and that in the end, they do the job well.

What this means in practice is that companies would hire inexperienced workers for lower pay and then build up their skills to make them profitable. This is a widespread practice in the Serbian IT sector. For example, Dragan was hired without prior IT experience for a software tester position[125]. Initially, he earned 400 euros, which was below the Serbian average wage and way below salaries in the software sector. In his words:

> It is common knowledge that Zvezda is a company for juniors. This is what everybody says. It gives less experienced people a chance. I can't say anything bad about them, as I got a chance with zero education and work experience in IT. And in just two years, I was offered the team lead role… But that also means that more experienced people are usually leaving because they are not happy with what they do and learn in Zvezda. And also with the salaries, which are lower than in other companies.

Another way in which Zvezda gets cheap, inexperienced workers is through an internship programme. According to the company's data on website, it provided 300 internships in 2022. This way, the company can hire fresh engineers straight from university. As the company CEO said, inexperienced people are cheaper and easier to mould into the organisational culture. Krstan was one of the workers who got into the company through the internship programme[126]. For him, an internship was a way to "just enter into the labour market and get some work experience." He was in his third year of studies in software development when he decided to start working. The company was well-known and present in the media and was among the few internship options at the university. After starting the internship, he was able to earn some pocket money and learn how software development works in practice. Slowly, he began to give up on the university after he was offered a junior position following the internship. The starting salary was low in his view, but it was much higher than what he had as a student, which was enough at the time. Since then, he has advanced in the company ranks, and his salary has increased several times. Srdjan, another former Zvezda intern and a worker, is more critical of

[125] Previously referenced. Interview conducted in August 2023
[126] Previously referenced. Interview conducted in August 2023

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this approach to hiring[127]: “The basic business model of Zvezda is to produce quantity over quality. They are just employing interns and juniors in bulk, straight from the university. They pay them next to nothing and give them projects way above their skills that they charge well from the clients.”

Once companies like Zvezda have created cheap labour by hiring inexperienced workers, they attempt to charge their clients as much as possible by presenting themselves as more skilled and experienced than they are. This is a general trend of fast internal promotions in the IT industry elsewhere (Feuerstein, 2013). This process is explained by Zvezda’s workers. According to Krstan[128]:

> The company's goal is to rent out as many of its people as possible at the highest price. It is a public secret that everyone is sold at least one level above their own. The company instructs me to boost my LinkedIn profile and bio to make it appear I have more experience and know more technologies than I do. If I am a junior with one year of experience, they are trying to sell me as a medior. Clients sometimes figure it out during technical interviews and ask for someone else, but often don't.

Dragan explains this process further, and provides an example of his first work-day:

> If the client needs mediors or seniors, we will find them – someone who has just started working can be sold as they have five years of experience. So, the company can profit a lot from this without losing much. Especially if we already have several of our people on their projects and they are satisfied, we can easily put in new people with others covering for them. If the general impression is good, they always try to sell it, and if it goes, it goes.
>
> On my first day in Zvezda, I arrived for work at 10 AM and had a call with clients at 1 PM. I didn’t know anyone at the company or how it worked, so I just started the grinder right away. I didn’t have time to go home for at least one day to comprehend everything that happened; they just threw me in the water. They charged me as a medior, although I worked for only 3 hours and knew only what I learned in the courses[129].

Ultimately, through these mechanisms of hiring cheap, inexperienced workers and then selling them as more experienced, the company is capturing value not by directly exploiting labour in a Taylorist manner, but by manipulating labour prices to capture surpluses.

[127] Previously referenced. Srdjan left the company in early 2022. Interview conducted in September 2022
[128] Interview conducted in August 2023
[129] Interview conducted in August 2023

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Implications of subcontracting for value capture

As outlined in the chapter, subcontracting and outsourcing companies operate as brokers, bringing together companies and workers and patching together global production networks. They create value through intermediation by creating new markets and reducing transaction costs, but also organising and training labour and increasing productivity. Most of the chapter has however, been about the value capture dynamics. These firms enable value capture for clients or lead firms through labour cost reduction, while also capturing value themselves through intermediation. They capture value primarily through rents from intermediation in the setting of uneven global prices, and by extracting more surplus value from labour through managerial practices and the labour process.

What are the broader value capture implications of this outsourcing model? As outlined in the introductory chapter, this outsourcing-based IT sector has been praised for its potential to drive economic development. Like other economies on the European periphery, Serbia has been weakly integrated into global production networks, primarily providing low-cost, low-skilled services to Western European companies. In this context, the rise of IT outsourcing was framed as a historic opportunity for integration into high-value segments of the global economy (Hardy & Hollinshead, 2016b). The sector's share of GDP, alongside high salaries relative to national averages, compared with most European countries,[130] provided evidence of the sector's high development potential. Compared to other sectors, the IT industry showed significantly higher growth in both revenue and employment, and its profitability index per employee was 636% of the overall economy's average (Matijević & Šolaja, 2020). Furthermore, the outsourcing-based IT industry required far less investment than other industries, enabling high profits at lower costs (Matijević & Šolaja, 2020). All of the development in the sector and large profits

[130] https://emerging-europe.com/it-landscape-report/

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came seemingly effortlessly, in contrast to manufacturing outsourcing in Serbia, which is heavily dependent on state subsidies.

This model enabled the emergence of highly profitable companies in Serbia during a challenging post-socialist transition with limited opportunities. Unlike most struggling industries, these IT companies managed to navigate global markets and capture value from global production networks (Avlijaš et al., 2023). Importantly, they also lead to the creation of tens of thousands of highly skilled, well-paid jobs, previously mostly unavailable in the country, thereby providing value-capture opportunities for workers as well.

However, despite the significant economic benefits in a struggling economy, the value capture prospects of such a model are seen as relatively limited. This model, rooted in providing low-cost digital labour to foreign clients, offers limited prospects for long-term development. Critics argue that the sector's focus on "selling cheap labour" and providing services without owning or developing final products leads to a "lack of added value" and weakens its developmental capacity (Matijević & Šolaja, 2020, 2022). In this model, Serbian IT firms, like those in other outsourcing-focused countries, are failing to build local capabilities or generate significant spillover effects(Guga & Spatari, 2021). According to assessments by one of the key IT market experts, by focusing on outsourcing and exports, the sector ultimately benefits only owners of large outsourcing firms, often in foreign ownership, at the expense of developing local digital products.[131]

As subcontracting companies provide services only to foreign companies and not locally, IT companies often become isolated "cathedrals in the desert" (Hardy, 1998), with minimal interaction with other local firms or institutions. The key reason is that local companies, as well as the government, cannot afford expensive software development services, and all companies

[131] As per opinion of one of the key analysts in the sector: https://www.sito.rs/ko-najvise-profitira-na-rastu-it-izvoza-iz-srbije-razvoj-koji-moze-da-nas-unazadi/

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focus on foreign markets. This lack of local interconnections reflects the high mobility of capital and the overwhelming orientation toward foreign markets (Hardy & Hollinshead, 2016b). As D'Costa (2011) notes, in the Indian context, IT services are often not even used by local clients, thereby missing the very mechanisms through which development might otherwise occur, including technological diffusion, knowledge exchange, and demand for local innovation.

The IT sector is completely separate from the rest of the industry due to the lack of industrial production networks.As per a representative of the Serbian IT Association - an organisation representing the interests of IT companies:

> We do not have enough money to pay for our own IT companies – we are expensive for ourselves. It is exceptionally difficult to sell services in Serbia and remain profitable. For example, a website for a U.S. client would cost from 15,000 to 20,000 dollars. In Serbia, the same website would be maybe 1000 or 2000, and it would come with a lot of negotiation and the risk of not getting paid. This makes it impossible to cover developers' costs at current prices[132].

Similarly, a representative of the IT company cluster[133] describes what he believes the Serbian economy gains from this outsourcing arrangement:

> The only spillovers of the IT sector are wages and taxes, as well as some stimulation of local businesses, such as cafes, catering, and taxis. But when you look at the margins in the IT sector globally, this is literally just crumbles. Due to general poverty, this is often perceived as a lot already.

Finally, in addition to limited value-capture opportunities, the simple outsourcing model described in this chapter proved unsustainable in the long run. As shown in the following section, the maturation phase meant a large influx of foreign multinational companies into Serbia in the 2010s. This led to increased competition for labour and rising workers' negotiating power, which significantly increased labour costs. As the staff augmentation model was based

[132] Association gathering a large number of companies, mostly mid-sized, employing around 9000 workers. Interview conducted in January 2025

[133] Cluster previously referenced, gathering companies employing around 6500 workers. Interview conducted in March 2022

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on the assumption of providing cheap labour, the main sources of rent - stemming from privileged access to human resources - began to melt away. This way, while subcontracting provided high value capture for intermediaries like Zvezda and online platforms in the early stages of the sector, their rents were eroded by competition, further illustrating the temporary and contested nature of value capture in the outsourcing-dominated industry. The maturation and expansion of the sector, along with related value-capture dynamics, will be the topic of the next chapter.

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CHAPTER 4: BEYOND ARBITRAGE: THE POSSIBILITIES OF ECONOMIC UPGRADING IN THE SEMI-PERIPHERY

The previous two chapters analysed the integration phase of the Serbian IT sector, characterised by simple forms of outsourcing and a disproportionately large role of brokerage. This chapter instead focuses on the following expansion phase. Over time, the sector grew in terms of the number of companies and workers, and it also underwent consolidation, mostly at the hands of multinationals. Faced with competition pressures and lower value-capture opportunities in staff augmentation, some local companies attempted to shift towards higher-value activities, which can be understood as economic upgrading.

This chapter will focus on the value-capture dynamics in this maturing market and on attempts at economic upgrading. While one part of upgrading involves foreign companies outsourcing higher-value functions to Serbia, such as research and development, I am focusing on the other part: local companies' opportunities for upgrading. This is a patchy process where some attempt and fail, while most of the sector remains in the outsourcing model described previously. Only a small number of local subcontracting companies manage to upgrade to more advanced forms of outsourcing, and even fewer succeed in developing and marketing their own digital products. Conceptually, I illustrate the value-capture trajectories through the upgrading of individual companies that are attempting to navigate the global economy with limited state support. I will again rely on the concept of economic rents to illustrate interfirm competition and the ways in which firms capture value through preferential market positions.

This needs to be understood in the broader structural context of uneven geographies and the semi-peripheral position of the sector and economy at large. Firstly, due to its position in the

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global economy, Serbian companies struggle to access markets and the capital necessary for upgrading, and face high competition for higher-value functions from companies in core economies. Simultaneously, Serbian companies are competing with locally operating multinationals for labour, which is getting more expensive, while also competing with companies from the economic peripheries for projects. This is characteristic of a semi-peripheral middle-income trap position. Despite different forms of proximity to the Western markets described in Chapter 1, Serbian companies still have a non-price edge in securing projects compared to companies from the global peripheries. Serbian companies are tied to semi-peripheral advantages and have significant agency in the struggle to capture value in these constrained markets.

First, this chapter will provide a theoretical framework for understanding upgrading and value capture, and describe the broader context of the sector's maturation phase. Then I will move on to conduct an empirical analysis of upgrading processes primarily through a case study of Zvezda, as well as the role of the state in such processes. It will conclude with reflections on upgrading and value-capture implications.

Economic upgrading, semi-periphery, and uneven development

As explained in the introduction, Global Production Network (GPN) approach contrasts with earlier theories of economic development, such as modernisation theory, which saw development as a linear process in capitalism (Rostow, 2000), dependency theories that emphasised underdevelopment and dependency as structural features of the global capitalist system (Cardoso & Faletto, 2024; Frank, 1967; Wallerstein, 2020), and developmentalist state literature that saw development primarily as the outcome of active state policies (Amsden, 1985; C. Johnson, 1982). While acknowledging the importance of integration for development, global economic asymmetries and the key role of the state, the GPN instead focuses on the

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multi-scalar and networked organisation of production in the global economy. It emphasises how local development outcomes depend on the mechanisms by which regions and firms are integrated into transnational production systems and on their ability to capture value (Coe & Hess, 2010; Coe & Yeung, 2015).

I am building on the GPN approach to analyse one form of such ´development´ or transformation of the sector towards higher-value functions, enabling higher-value capture opportunities for local actors (Coe & Yeung, 2015). This is a meso-level approach that enables me to examine different ´value-capture trajectories´ or methods to capture more or less value (Werner, 2019), including through economic rents (Kaplinsky, 1998, 2019). As explained previously, outsourcing companies in the Serbian IT sector were accruing human resource and relational rents through their unique ability to capture value from mediation between capital and labour. However, as rents are eroding due to competition, companies are forced to continually seek new sources of rent to remain competitive and capture value. This treadmill dynamic can be seen as a structural feature of capitalism, in which, due to the temporary nature of productivity advantage, companies are constantly forced to innovate and reorganise (Postone, 1993). In this chapter, I examine shifting rents to explain the dynamics of transformations in the Serbian IT sector across uneven geographies and the possibilities for value capture.

The improved capacity of suppliers to capture more value is most commonly analysed in GPN through the concept of economic upgrading. Upgrading can be defined as the process by which economic actors - nations, firms, and workers - move from low-value to relatively high-value activities in global production networks (Gereffi, 2019). Such upgrading should enable companies to capture higher value and continue participating in the networks, while also making them less replaceable (Blažek, 2016; Gereffi, 2019; Plank & Staritz, 2013). There are different types of upgrading, but functional and product upgrading are the most relevant for the

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dynamics in the Serbian IT sector. Firms engage in functional upgrading, or shift to higher-value-added activities in production, to capture more value from labour, while abandoning lower-level functions in production networks (Blažek, 2016; Feuerstein, 2013). Product upgrading is the shift to higher-value products within the production network. Other types of upgrading not elaborated on in this chapter include process upgrading or simply optimising production and reducing costs, and chain upgrading or moving to higher-value industries.

While the GPN approach is helpful for analysing these processes, it is also necessary to outline the barriers and opportunities for upgrading and development, and to expand the GPN approach with more structural approaches. One of the main critiques of the GPN approach is that production networks are situated in uneven geographies within which value-capture dynamics envelop (McGrath, 2018). The form and intensity of value capture in different parts of the globe are hierarchical, regionalised, and interconnected – ultimately dictating the value capture opportunities of local firms and labour (Selwyn, 2014). Thus, in general, it is also essential to consider how different regions or sectors are positioned within global economic structures, ranging from the core to the periphery (Werner, 2019). Accordingly, in this chapter, I bring together GPN with more structural approaches to uneven development to better capture upgrading possibilities of local firms.

One of the ways in which I am overcoming these limitations is by the concept of semi-periphery outlined in the introductory chapter (Avlijaš & Gartzou-Katsouyanni, 2024, 2025). Broadly, sectors and places can mix constraints typical of the periphery, such as FDI dependence, exposure to lead-firm rule-making, and institutional fragmentation, together with core-like enablers such as macro stability, skills, infrastructure, and access to high-value niches. This is the case with post-socialist Eastern Europe, where inherited skills and proximity to Western markets facilitated integration into European value chains. In addition to purely economic considerations, I also consider linguistic and cultural proximity to be important factors in

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linking with European and U.S. clients. At the same time, Eastern European economies are characterised by asymmetric insertion in GPN, where growth models rely on foreign capital, producing heterogeneous economic structures (Bohle & Greskovits, 2012; Nölke & Vliegenthart, 2009; Pavlínek et al., 2009), as well as inequality, informality, weak state capacity, and clientelism (Doner & Schneider, 2016). As part of the semi-peripheral condition, it is important to acknowledge the middle-income trap at the sectoral level to explain how growth slows once cost and imitation advantages are exhausted and upgrading into innovation-intensive activities is constrained (Agénor, 2017). Finally, consistent with newer GPN scholarship, I treat the semi-periphery as a set of enablers and constraints, and I see positions of local firms as contested and changeable (Bril-Mascarenhas et al., 2025; Naseemullah, 2022).

On top of uneven development, I am also analysing the role of the state, a crucial factor in the processes of economic development. I see the ability of the state to guide the development of the local economy depending on two factors: 1. the position of the economy/sector in production networks and unevenly developed geographies more generally, 2. the state's political economic model and developmental capacities. Firstly, the state's ability to guide development depends on the strength of the local economy and the balance of power vis-à-vis foreign capital (Coe & Hess, 2010; Horner, 2020; McGrath, 2018). In sectors with high capital mobility and low regional specificity, such as the outsourcing-dominated IT sector, the provision of cheap labour is often a principal way to attract and retain global capital (Coe & Hess, 2010; McGrath, 2018; Noronha & D'Cruz, 2020). From the GPN perspective, this can be characterised by the concept of dependent or subordinate coupling: multinational companies have asymmetrical power over local firms, labour is replaceable and engaged in lower-value-added activities, and local value-capture opportunities are limited (Coe & Yeung, 2015; MacKinnon, 2012). Thus, in contrast to the developmental state literature, it is important to

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consider the state's power and the complex positions of economies within global production networks (Naseemullah, 2022).

Secondly, the political economy accounts of the semi-periphery and the middle-income trap also stress that the limits of the state's role in development are not just economic but also institutional and political (Doner & Schneider, 2016). Semi-peripheral states are often mired in clientelism, informality, and weak state capacity, which prevent the formation of "upgrading coalitions" capable of building the institutions required for economic upgrading. Clientelism and elite capture divert resources away from long-term upgrading toward short-term distributive politics, while multinational corporations often bypass domestic coalitions altogether by relying on their own global supply chains and skills networks (Avlijaš & Gartzou-Katsouyanni, 2024; Doner & Schneider, 2016). Such conceptualisation can be generally applied to the analysis of the Serbian economy (Avlijaš et al., 2023; Mikuš, 2018; Upchurch & Marinković, 2011). As a result, most of what can be considered economic upgrading and development is based on the inflow of foreign capital, as well as on complex and messy value-capture trajectories of individual local firms (Avlijaš et al., 2023; Avlijaš & Gartzou-Katsouyanni, 2024). Thus, this represents a significant contrast to the developmental state literature, outlined previously, which focuses on East Asian states guiding development. So far, I have emphasised the state's role in the sector's integration phase, particularly in cost absorption and education provision. In this chapter, I show the structural limits in state-facilitating upgrading and broader economic development.

Thus, ultimately, my conceptual contribution is bringing together these different strands of literature. While primarily relying on concepts of the global production network to explain the sector's development, I complement this with conceptions of the semi-periphery and the literature on semi-peripheral states to overcome the constraints of this firm-centric, network-focused approach.

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Serbian IT sector coming of age: expansion, multinationals and economic upgrading

While the previous chapter described the context of simple outsourcing arrangements in the developing market, this chapter introduces a novel context of maturation and consolidation of the IT market. These processes have been characterised by the increase in the number and size of companies, the influx and market domination of foreign multinationals, and economic upgrading. Economic upgrading, or a move towards higher-value activities, is reflected in a shift towards more specialised outsourcing and the development of digital products, including by start-ups.

As outlined in the previous chapter, massive outsourcing of software development in Serbia began in the mid-2000s, coinciding with the global surge in demand for software development and the substantial relocation of software production on the global scale at the onset of the 21st century. The mounting digital transformation of industries, the expansion of the internet, increased funding for start-ups, improved internet infrastructure, supportive policies of host countries, and the growing expertise of outsourcing companies stimulated this growth (Manning et al., 2018). The growth in experience, as well as trust-building between clients and subsidiary firms, has accelerated outsourcing further, leading to the emergence of key tech clusters worldwide (Dedrick et al., 2011; Dibbern & Hirschheim, 2020; Kotlarsky & Willcocks, 2009; Manning et al., 2018).

While initial outsourcing agreements were relatively simple bilateral arrangements between a supplier and a client, in this period they began to turn into complex cross-border networks of outsourcing arrangements with multiple layers of suppliers (Hirschheim et al., 2009). The increasing complexity and fragmentation of these production networks were mostly the result of initiatives to cut costs and increase flexibility (Wolff, 2016). Initially, only lower-value

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functions, such as software coding and testing, were outsourced, which require little tacit knowledge and minimal communication with the client, while functions like software architecture and business development remained in-house (Flecker & Schönauer, 2016). However, with time, lead firms also started outsourcing higher-value functions (Hardy & Hollinshead, 2016a). This is one of the processes of economic upgrading.

Until the mid-2010s, the Serbian IT sector was dominated by domestic subcontracting companies specialising in staff augmentation, such as Zvezda, with only a few multinational firms on the market. One senior IT developer, Sergej[134], explains the labour market of that time in the following way:

> In that period (before expansion), Microsoft and Nordeus were the holy grails that paid way bigger salaries as they worked on their own serious products, while everyone else was doing simple outsourcing. These were the only more complex jobs available to the developers at the time.

However, it was not only Zvezda and similar local outsourcing companies that recognised the opportunity to capture value through uneven global labour prices. Soon, many foreign and local companies entered the market in search of software developers. This surge in outsourcing was not only due to earning opportunities but also to the multiplicative effect of outsourcing triggered by companies like Zvezda. With every new outsourcing project, Serbia was becoming a more attractive IT destination for foreign companies. This was partly due to the increased reputation as an IT outsourcing hub, and due to local capability development and increased knowledge in carrying out software development projects (Matijević & Šolaja, 2020; Živković et al., 2018). This happened alongside a general global expansion of outsourcing in the post-2009 world.

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[134] Sergej is a senior software developer transitioning to a manager in one mutliantioanl software firm in Serbia, ultimately transitioning to remote work. He started his career in 2012, while the sector was still in earlier stages of development. Interview conducted in August 2023

Many multinational companies entered the Serbian market, opening their captive branches in the country. This included both software companies and firms in industries where software was not the core product, such as automotive firms. Instead of relying on intermediaries such as Zvezda for providing labour, they came directly to the source of value. Thus, in this period, the growth of the IT sector was primarily driven by the influx of foreign companies and capital (Matijević & Šolaja, 2022). This included companies such as Swiss Zuhlke engineering and Luxoft; American EPAM and Synechron; British-American Clarivate; British Endava; French Ubisoft; as well as German automotive company Continental, employing more than 1,000 engineers. These companies jointly hired thousands of workers and brought significant competition to the Serbian labour market. These were usually larger companies with significant capital, while the majority of the local IT sector still consisted of locally owned small and micro companies. Importantly, some of these companies opened their development centres and also hired workers to work on their own digital products. This can be considered economic upgrading of the sector, as it represented, to a certain extent, a shift towards more specialised economic activities.

In parallel to the entrance of multinationals, the number of local outsourcing companies and freelancers also grew significantly. As seen in the figure below, since 2010, the number of software development companies has continued to grow, particularly after the onset of the COVID-19 pandemic lockdowns in 2020. The number of companies increased from slightly over 1,000 in 2010 to over 6,000 in 2024. As mentioned in Chapter 2, by 2024, there were also 23,000 self-employed software developers in the sector. This does not include a large number of those not officially registered as self-employed.

Figure 4 Number of IT companies in Serbia through time

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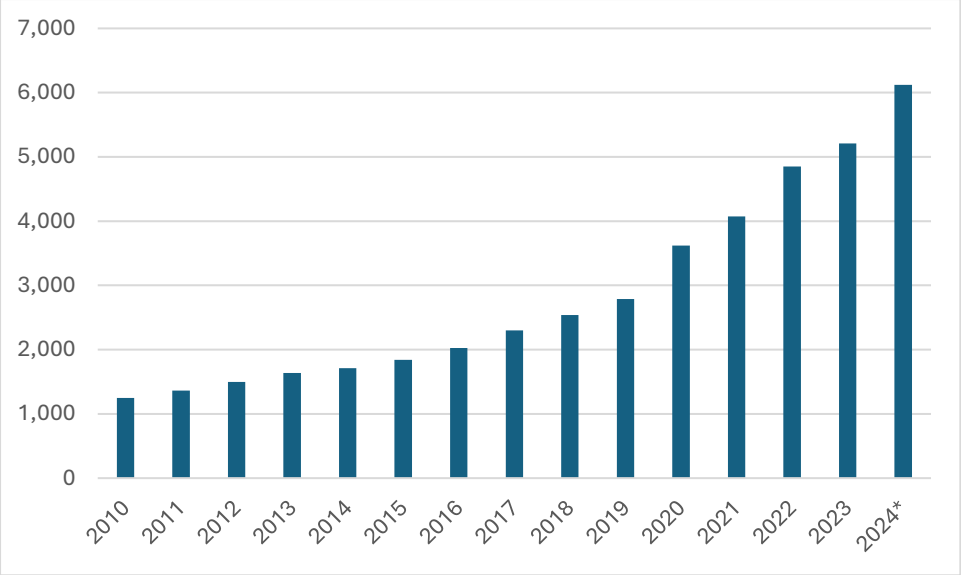

Source: APR – Serbian national registry of enterprises. Data retrieved in November 2024

It is not only the number of companies that has increased, but also a constant growth in the size of already established outsourcing companies. For example, the number of employees in six leading software export companies, Schneider Electric, Levi9, Endava, RT-RK, IGT and Nordeus grew from less than 500 employees in 2009 to around 2500 in 2016, which is a sixfold increase (Matijević & Šolaja, 2022). In the period 2016-2021, employment rose 3-fold, which is an impressive annual growth rate of more than 20% (Matijević & Šolaja, 2022). According to data from the Serbian enterprise registry, there was only one large IT company with 500 or more workers in 2013; by 2024, that number had increased to 13.

In addition to size, foreign ownership was crucial to this sector's transformation. The influx of large foreign companies disrupted the market. According to IT market research, companies with foreign ownership accounted for 3/4 of the largest 500 IT companies in Serbia and 80% of all employment (Matijević & Šolaja, 2022). The 2024 report of the Serbian Gaming Association shows the same dynamics. While in 2017 most companies in the sector were locally owned, only 3 of the top 15 are now. Furthermore, the total revenue of the 10 largest

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locally owned companies is $20 million, out of $210 million in total revenue from the 15 largest companies overall.[135]

According to the IT market expert I interviewed[136]:

> Foreign multinationals came to dominate the sector. They brought large budgets and could pay higher salaries. It's also important that they bring the opportunity to work in well-known brands. This meant that there was a large outflow of workers to the new captive companies, which was a huge blow to standard outsourcing in Serbia, which could not afford to compete. They had fewer paid projects and could not afford to pay workers that much or provide that much prestige.

This competition for labour and the consequences for workers will be described in more detail in the next chapter.

These trends had important implications for companies like Zvezda. While having exclusive access to labour in Serbia and clients in the West, they were earning rents from this mediation. However, the entry of new companies changed that dynamic. As per this expert: "Until then, it was important that someone had great connections abroad, like on Upwork or Toptal [online platforms], or through personal contacts, and that they could gather people to work for them. These new foreign companies changed that." This change was principal: local companies could no longer rely solely on human resources and relational rents described in the previous chapter, as they no longer had exclusive access to the workforce or clients. In fact, many of their former clients came to Serbia to hire workers directly, effectively cutting subcontractors' rents. This significantly reduced the value-capture opportunities for local outsourcing companies, while expanding them for foreign multinational companies.

Local outsourcing companies had to adapt. In a personal interview, an expert in the sector described the transformation[137]: "Sometimes previous outsourcing companies were bought by the new multinationals, simply transferring their teams to them. The ones that survived had to

[135] Serbian Gaming Association Annual Report 2024. Available at: https://sga.rs/godisnji-izvestaj/
[136] One of the leading researchers on the sector. Interview conducted in December 2024
[137] Previously referenced expert

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undergo a transformation, providing full services to clients, working directly with them, or being innovative in other ways. Still, until today, many of them managed to remain in this standard outsourcing form, but it is getting harder with the crisis." Zvezda is one of these companies that not only survived but also grew beyond 1,000 workers, effectively competing with multinationals. This is due to its effective labour management process described above, which primarily consisted of hiring junior developers and selling them. Amid the transformations taking place around them, they also devised and implemented new strategies to acquire clients and expand services, as described further in the chapter.

Many start-ups also started developing their services in Serbia, although they played a smaller marginal role in the sector. Serbia's startup ecosystem has also shown some limited growth in this period. In 2021, the ecosystem attracted $135 million in investment, 600% more than in 2020, and in 2022, it grew by an additional 20%. By 2023, the total ecosystem value reached a record $1.1 billion, up 66% from the previous year. Still, this upgrading was also limited, with 45% of startups having no monthly recurring revenue and most of them operating only locally or regionally. Most start-ups were unable to transition into mature phases of growth, struggling with market validation, customer acquisition, and revenue generation. The key reason for this is seen to be a lack of access to capital, markets and business experts.[138]

Thus, the key trends in the sector's expansion phase are the increased number of companies, growth in company size, an increasing share of foreign ownership, and partial sectoral upgrading. Upgrading occurred through the entry of multinationals hiring local workers for higher-level functions, the further specialisation of outsourcing companies, and the proliferation of product companies and start-ups. However, as the economy matured and

[138] As per analysis in a newspaper article, but also corresponding to several interviews I conducted with experts and company owners. Article available at: https://www.nin.rs/ekonomija/vesti/75581/smanjuje-se-broj-domacih-startapa-ali-to-ne-mora-da-bude-lose

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upgraded, the competition for labour also intensified. This is the broader context in which economic upgrading in the sector should be understood.

Paths towards economic upgrading in the Serbian IT sector

For subcontracting companies like Zvezda, the sector's maturation meant, on the one hand, rising labour prices and scarcity, and, on the other hand, opportunities to capture more value through deeper relations with clients in Western countries and the greater knowledge they developed. To remain competitive, escape replaceability at the bottom of global production networks as labour providers, and increase value-capture prospects, some companies attempted to move towards higher-value activities. This includes business activities, such as design, research, and development, and post-production services that are considered high-value functions, in contrast to simple production and assembly (Rungi & Del Prete, 2018). In the context of software, this would mean moving from freelancing and staff augmentation towards research and development, as well as custom software development and co-development with clients, and design of original digital products (Aridi et al., 2021).

There is a consensus among the experts and company owners I interviewed about the need to upgrade to gain competitive advantages beyond labour price.[139] According to the key research report on the IT sector, the outsourcing model needs to evolve towards specialisation and eliminate middlemen to enable direct contact with customers (Matijević & Šolaja, 2022). Others in the sector talk about the imperative for the local IT companies to start building their own products and 'offering something better, instead of just working hours'[140] - leading to much higher profitability and scalability of operations. This is a general sentiment shared among companies and investors in the sector.

[139] Also in various news reports on the sector including: https://rs.bloombergadria.com/biznis/kompanije/72708/koliko-su-plate-u-srpskom-it-ju/news

[140] ibid.

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The broader value-capture implications of these processes should also be considered. According to previous research, not only do Serbian companies capture less value due to rising labour costs, but labour shortages also reduce opportunities for endogenous development (Matijević & Šolaja, 2020). As one of the key sector experts argues, unless labour is redirected toward domestic industry, Serbia will remain locked into a model in which it exports qualified labour to fill demand in Western markets and imports expensive technological solutions—a net developmental loss.[141] Another side of the issue is the systematic outflow of value from Serbia to the core economies. According to the interview with the expert referenced previously:

> The market power concentration among foreign companies is high and increasing. The capacity is on their side, and it is hard to build a company without it being taken over by them sooner or later. Practically the whole growth of the IT sector in the last 15 years is tied to foreign companies. These are not companies, in fact, but employment agencies. They come and budget people, while all the profits end up abroad with the mother company. Even when they open a research and development centre, the value is created here, while its valorisation and value chain are in other places. The rest of the domestic companies are also mainly in the outsourcing business, while very few develop their own products. Ultimately, everyone just grabs the labour, without bringing any other tangible benefits to the country, apart from salaries. The economic potential here is very limited[142].

Such a perspective is shared by the former president of one major IT association:

> Serbia is primarily a cost centre, as we receive only limited taxes and salaries, while the entire profit goes abroad, along with corporate income tax. Few domestic outsourcing companies (like Zvezda) that keep profits here and reinvest are a rarity. We need to get out of this modular screwdriver model, but there was little understanding of that because everyone was happy with what they got from outsourcing[143].

Based on these observations, I place the processes of upgrading at the centre of this chapter. One way to view the processes of upgrading is through the notion of economic rents, as explained in the previous chapter. Due to diminishing potential to capture value from labour arbitrage, local companies have reduced power to accrue rents (Kaplinsky, 1998, 2019). But

[141] "Brži Informatički Razvoj i Uloga Države | SITO," accessed July 8, 2022, https://www.sito.rs/brzi-informaticki-razvoj-i-uloga-drzave/.
[142] Interview conducted in December 2024
[143] Interview conducted in february 2022. At that time, he was already out of the president role for around a year

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what is needed for upgrading? According to previous research, upgrading depends on the ability of IT firms to develop technical, managerial, marketing, and client relations capabilities (Aridi et al., 2021; Ethiraj et al, 2005; Li et al., 2010). In particular, client-specific abilities refer to the ability to secure projects through relationship management and trust-building. This is tightly related to marketing capabilities that enable companies to stand out from the competition. Capabilities needed for different types of upgrading also differ. In functional upgrading or moving towards sophisticated forms of outsourcing, such as custom software development, stronger managerial and client relations are crucial, alongside strong technical skills. However, product upgrading requirements are much more complex and include R&D, marketing, customer service, and venture capital funding; this form of upgrading entails high risks and large capital requirements (Aridi et al., 2021).

As shown in the following sections, these processes are further contingent on global economic structures and the potential role of the state. The challenges to firms highlighted above are typical of semi-peripheral sectors - best explained through the middle-income trap. It is characterised by the disappearance of cheap labour, high competition with foreign multinationals, and difficulties in scaling into higher-value activities. However, it will be shown throughout the chapter that semi-peripherality can also be an advantage in competition for clients in core countries, due to various forms of proximity to core markets and a developed skill base.

I will analyse these processes through the case study of Zvezda, which is actively trying to upgrade in two main ways. The company is attempting to functionally upgrade by transitioning from staff augmentation to custom software development and whole-project development to become a first-tier supplier. Zvezda is also upgrading through attempts to develop its own products. In both cases, the goal of Zvezda is to capture more value by moving towards more profitable positions in the production network. The following subsections will be based on

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Zvezda´s experiences. Through a case study, I will describe the structural enablers and obstacles to upgrading, and the specific ways in which companies like Zvezda are navigating them. This will provide broader insights into the possibilities for value capture and development in the context of a middle-income economy.

Breaking out from the semi-periphery: the prospects of functional upgrading

In this context, functional outsourcing means eliminating intermediaries by working directly with clients and offering them customised, end-to-end software development. Significantly, these processes deliver higher incomes per employee than standardised and generic staff augmentation and reduce the risk of replaceability (Matijević & Šolaja, 2020). As a result, suppliers develop expertise and domain knowledge, effectively manage projects, govern client relationships, and provide proactive solutions (Kotlarsky & Willcocks, 2009). Closer relationships with clients and company branding ultimately enable more value capture. However, upgrading is not only about an individual firm's technical capabilities, but also about navigating the middle-income trap and leveraging semi-peripheral enablers through active marketing and relationship management.

Zvezda has been actively transforming its business model over the last several years. In addition to staff augmentation, the company offers services including end-to-end digital product development, market research, user experience design, data science & AI, software architecture, and project implementation and data engineering. Zvezda CEO explains in his autobiographical book[144] that this transformation from lower-level outsourcing to functional upgrading:

> When we started, we were a 100% outsourcing company. We had top engineers who knew the technologies, and that was it. During the last several years, we have been switching to end-to-end services. We can't compete with companies from India with

[144] Not referenced for anonymity concerns. Authors translation to English from Serbian

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> just labour costs...End-to-end service means that the hours of the engineers are no longer crucial.

He further explains how this process also goes hand in hand with the disintermediation from the higher-level suppliers:

> The difference between this and standard outsourcing is that in outsourcing, we are third or fourth-level suppliers to someone else. A big company from abroad gets the work, hires us, or hires someone who hires someone who, in turn, hires us. And in that case, the clients did not know who we were, so we did not build a brand name or develop expertise. Also, money is much smaller when someone else is contracting you. In end-to-end software development, we work directly with clients and manage projects. This also means we are visible, have a name, and, of course, receive higher compensation for our work.

Increasing knowledge of the clients' needs and proactivity appear crucial for the company. The company is trying to move to a model that offers not just coding but also services such as strategic thinking and implementation methodology. For this, Zvezda began employing people with extensive experience in the software industry, often from abroad. According to the CEO's notes in his book: "They brought knowledge and experience that did not exist in our country - primarily because there are no such big and advanced companies here and because the IT industry in our country is relatively young." He further explains this focus on clients' needs:

> Part of our onboarding process and culture is proactivity… Being proactive means providing solutions and adding value to clients beyond coding. It is only then that the price of services becomes secondary; it stops being important if you are cheap or more expensive than the competitors.

In his book, he further provides an example of these processes from their past experience:

> One of the largest insurance companies, with billions in income, chose a software company to provide it with software. Apart from us, three other companies also participated in the competition. One of them had around 10,000 employees, while the other two had over half a million people. We knew that other companies could offer their services much more cheaply, as they have development centres in India and other populous countries where engineer salaries are significantly lower than in our country.

However, Zvezda still moved forward with the project, playing the expertise card rather than the price. He continues:

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> We formed a team of experts in strategy development, product development, and digital system architecture. We conducted thorough research on the industry and the company, and sent people to London to learn as much as possible about the client's needs. The other three companies provided what was needed at a lower hourly rate. Even though we were significantly more expensive, we managed to secure the project by coming up with new ideas to optimise solutions that suited their needs. This is the general direction that our company tries to pursue: quality over quantity.

On top of knowledge, marketing and client relationship management are crucial for upgrading, as already outlined previously. These efforts seem essential to Zvezda´s success. According to the CEO, marketing and personal recommendations were the primary drivers of their growth. For over 10 years, their former clients' recommendations have enabled them to stand out and remain competitive. As per his book, in light of growing global competition, the company's primary strategy was to be "aggressive in highlighting all the advantages that hiring their company brings compared to large companies from populous countries in which engineers are mere fulfillers of the given tasks".

To further improve their client relationships, the company invested heavily in brand and marketing at the onset of the latest crisis. There are several ways they accomplished this. Firstly, they hired an agency in London to help them better understand the market and their clients. They also opened offices in London and New York to establish a presence and be closer to clients, and hired people with extensive consulting experience. Thirdly, they put significant effort into online advertisement through ´brand ambassadors´ or their employees writing content about the company on LinkedIn. Most importantly, they actively shaped their image through interactions with clients.

A large part of this marketing was an active demonstration of cultural proximity with clients, taking advantage of proximity factors facilitating outsourcing described in the first chapter, and actively creating this proximity. According to the CEO's book: "During the first meetings, we tell them about our company culture, how we live and work based on similar cultural principles to them and how much we invest in the quality of what we provide for clients." He continues:

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“Business space is also extremely important for marketing - important to convince clients that we are Western and that everything looks like in the West - ideally Silicon Valley” (ibid). To approach this model, the company put significant effort into creating open office spaces, using pleasant colours, fostering a relaxed work atmosphere, and even installing a giant slide in its offices. According to the CEO, this impressed many clients from abroad, who were surprised that ‘something like this exists in Serbia´ and that they felt ‘like at home in San Francisco’.

Zvezda CEO explains the benefits of such marketing further:

> There are many examples of local or regional companies that left a poor impression and were unprofessional. Makes clients think ‘In Serbia, they are not at the same level as we are in the West. It seems like a similar culture, but it is an outsider country.’ These impressions determine what price we can charge […]. Positive impressions make them think of us as partners who have value to offer, and not that they are above us and we are just providers who are paid to provide services.

He illustrates this with an example of a client company wanting to reduce the price of Zvezda´s services. When the client company's CEO and CTO came to visit and discuss this issue, Zvezda was actively trying to impress them with the offices and organisational culture, showing them around the city, and, in the words of Zvezda's CEO, “showing them our company is the West in the East”. According to him, they did not mention a price decrease a single time, while they reduced the prices of other subcontractor by 10%, attributing the success to their marketing.

However, Zvezda´s upgrade is only partial, despite the CEO's claims that they are ´done with outsourcing´. While it indeed secures direct contracts with some major lead firms and provides more complex end-to-end software services, the company is still largely providing simple staff augmentation. This is the first service listed on their website, and, according to conversations with company workers, it is still a prevalent model of work. Thus, while striving to move away from these simpler outsourcing arrangements, this proves exceptionally difficult for most subcontracting companies in Serbia. Some companies, like Ribar, have been in the staff augmentation model for years, as clients were primarily interested in obtaining cheap labour,

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preventing their upgrading. Although this company attempted to take on more complex projects, it was unsuccessful due to a lack of reputation and significant competition, leaving it mostly trapped in staff augmentation and software testing[145].

This is illustrative of many small subcontracting companies in Serbia. It also reflects the difficulties of upgrading in the context of fierce global competition for the places in the upper ends of global production networks (D'Costa, 2011), but also the trend that outsourcing clients avoid sharing critical, proprietary knowledge with suppliers due to fears of being displaced by them (Aridi et al., 2021). Because of these pressures, most companies cannot specialise while remaining flexible in terms of technologies and industries; instead, they push for a catch-all approach, providing only simple software development (Mijačić et al., n.d.).[146]

The Serbian IT firms are then mostly squeezed in a middle-income trap, with many obstacles to upgrading, and face competition from firms in countries with cheaper labour. However, a semi-peripheral position also plays to their advantage. As seen in Zvezda´s example, the ability to sell ´cultural proximity´ and ´knowledge of clients´ is crucial for securing clients. This way, the company is not merely capturing rent on control over cheap labour but also actively builds relational and brand rents that enable it to charge more for its services. The company´s position in Europe and proximity to clients at times enable it to outcompete companies in the global periphery, such as India. Thus, ultimately, in this context, functional upgrading can be seen both from the perspective of structural constraints and enablers, and as an active navigation by companies within global markets.

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[145] As per interview with Oskar, the company owner, conducted in September 2024
[146] Also per Netokracija, a popular IT portal, blogpostÖ https://www.netokracija.rs/it-otkazi-2024-218114

The limits of value capture: attempts at product upgrading in the semi-periphery

Another way to improve companies' positions in global production networks is to reorient toward product development. This is, in general, considered a more advanced form of upgrading than custom software development described in the previous section, due to higher capacity requirements and higher potential for value capture (Aridi et al., 2021). Instead of selling services or labour hours to other companies, software development companies switch to developing their own products and selling them at scale, independent of the number of workers. This type of outsourcing can attract significant investments and substantial value capture, as the company's revenues depend on its intellectual property as a form of rent rather than on the number of workers. This is what is labelled in the literature as the product rent (Kaplinsky, 1998, 2019).

However, this process is exceptionally difficult for companies in Serbia, as this section demonstrates (Aridi et al., 2021). Companies developing products need to have high technical, research, and marketing capabilities, but also crucially depend on capital and access to markets. In this section, I will show, through a case study of Zvezda, how firms without significant resources in semi-peripheries navigate these structural constraints and how, ultimately, such high-value capture opportunities are mostly reserved for companies in core economies.

Outsourcing versus developing a product is also a key debate in the Serbian IT sector. For years, industry leaders and experts have argued for the need to sell digital products from Serbia to capture more value from software development work. They highlight the need to move away from outsourcing, which is seen as a lower added service that does not lead to high profits or economic development opportunities.[147] According to some estimates from 2020, the average

[147] A general opinion encountered both in interviews and through desk research of publicly available online sources. For example, see the following four articles: https://www.bbc.com/serbian/lat/srbija-66880480; https://www.netokracija.rs/outsource-ili-product-kompanije-190363;

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annual revenue per employee in Serbian outsourcing companies is 2.5 times lower than in companies that develop their own products (€40,000 vs €100,000) (Matijević & Šolaja, 2020). By moving from service provision, the argument goes, companies can charge rents based on ownership of intellectual property and products that enable income scaling, rather than simple human resource rents.

Zvezda is also attempting to jump from outsourcing to product development. According to the interview with Zvezda CEO[148]:

> When the product is on the market, it generates significant income without additional input of money and time into it. Services, on the other hand, have to be done constantly, and their income practically depends on the number of workers engaged in projects and constant competitive struggles on the global market.

The company, therefore, is funding several startups that develop their own products. This way, they use profits from outsourcing to acquire a share in products that could yield higher profits in the future. The company does this in two ways - either by investing in start-ups and taking a share of their companies, or by supporting its own employees in starting product companies. While some of these start-ups have failed, others have started operating profitably, generating revenue for the company.

Zvezda is working on its own software products. According to one podcast interview of the CEO: "We learned how to make products for others, now they need to learn how to make it on our own."[149] In practice, Zvezda supports its own employees in founding start-ups, where the company invests and becomes a partial owner. For example, employees developed an app that measures workplace happiness and satisfaction. They created a separate company out of it and gave ownership to key people developing it. According to the CEO, this is one of the more

https://rs.bloombergadria.com/biznis/kompanije/32997/ni-autsorsing-u-srpskom-it-sektoru-nije-ono-sto-je-bio/news; https://www.helloworld.rs/blog/Vazan-milestone-Srpski-IT-po-prvi-put-u-istoriji-presisao-sve-usluge/19627

[148] Interview conducted in May 2022

[149] Publicly available podcast interview, not linked tdue to anonymisation concerns

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successful start-ups, generating some limited income. Another example is an e-commerce solution developed by two senior employees, who received 55% of the newly founded company's stake. The start-up grew to 80 employees and today provides customised e-commerce solutions for large international companies. At the start, Zvezda helped the company financially and even transferred some clients to them; the company now works independently. In 2025, Zvezda also launched AI software to automate document processing. On top of in-house development of software, the company also acts as one of the ´angel investors´ in the Serbian ecosystem - they are heavily investing in startups at their early stages of development in exchange for equity or a share. The initiative they are a part of funded many start-ups, but only a few succeeded in the market.

While being most rewarding in terms of value capture, product creation is also the most challenging form of upgrading for Serbian IT companies. I do not have access to data on the success of Zvezda´s product upgrading, although it appears to be limited and is making relatively small profits. Zvezda CEO explains these issues in an interview for a news article[150]:

> Developing one's own product is extremely difficult, despite the hype around it in Serbia, both in IT and with other products, such as raspberries. They need a very different set of people for services and products. For services, we need engineers and project and product development managers. To place our own products on the market, we need excellent people across diverse fields who understand how our clients think. Software development is the most predictable part of the process.

These issues were experienced firsthand by the company. For example, Zvezda tried to develop an enterprise content management system - a type of software for which their clients paid hundreds of thousands of euros or even millions per year to another supplier. As they were already experienced in developing those for other companies, they thought they could offer a cheaper product of the same quality. After many hours, they developed the software. However, they did not know what the market looked like or how to sell it and had no further budget for

[150] Publicly available news article with an interview. Not referenced due to anonymity concerns

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marketing or business development. Thus, after finishing, they just left it on the side and continued doing what brought them money - outsourcing. There are numerous such examples outside of Zvezda. However, the knowledge is only one of the obstacles in this process.

The troubles with developing software products in Serbia can be primarily illustrated by the lack of success of start-ups - newly formed product-oriented firms with high-growth potential and a focus on innovation. Despite a large number of start-ups, estimated at almost 4,000, their success is perceived as very limited: the total start-up ecosystem value is estimated at less than 1 billion euros,[151] and only a significant minority is profitable.[152] For comparison, the top 10 most valuable startup ecosystems in Eastern Europe are worth 200 billion. Serbia is significantly behind countries such as Bulgaria, Romania, Croatia, and Hungary, where the value of the startup ecosystem is estimated to be several times higher.[153] Importantly, Eastern Europe is not among the regions with valuable start-ups, with most located in the U.S. and China, and to a lesser extent in Western Europe.[154] Thus, it could be said that the Serbian start-ups are peripheral not only on the global scene, but also in the context of Eastern Europe.

Scaling start-ups is exceptionally difficult due to significant global competition. According to the interview I conducted with the director of one IT cluster of companie[155]s, "At every moment, at least 10,000 people are working on the same or similar software solution; it is a huge competition. This makes it very hard for our companies to succeed on the global market, taking into account the lack of access to capital, markets, knowledge, etc." These different obstacles will be explained further in this section.

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[151] As per StartupGenome, key data source for startup data globally. Available at: https://startupgenome.com/ecosystems/belgrade-and-novi-sad
[152] As per startup scanner report from 2024. Available at: https://www.preduzmi.rs/en/startup-scanner-2024/
[153] As per Dealroom data – the most comprehensive database on startup funding. Accessed through Vestbee atÖ https://www.vestbee.com/blog/articles/cee-startups-are-worth-213-b-with-poland-ukraine-and-estonia-contributing-50-to-the-region-s-enterprise-value-report
[154] As per Dealroom: https://dealroom.co/guides/unicorns
[155] Previously referenced. Interview conducted in March 2022

As already mentioned in this section, experts and company owners commonly complain that Serbian companies lack the skills to create and market digital products. Not only technical but also business and marketing skills are needed to envision, design, and sell a product to clients. This can mainly be attributed to the focus on outsourcing and to a lack of knowledge of foreign markets and final product buyers, as a consequence of peripherality in global production networks. While companies still managed to build some of that knowledge, they were primarily focused on software development, being far from final markets (Matijević & Šolaja, 2020a, 2022; Živković et al., 2018). Such issues are typical for outsourcing destinations such as Serbia. For example, research from Romania also indicates that significant issues exist along the path to upgrading in the Cluj IT cluster, and many efforts are focused on developing a ´product´ rather than an ´outsourcing mentality´ (Mateescu, 2022). This reflects a broader global division of labour in the IT industry, where the skills needed for product development and sales are still mostly sought in core economies and are scarcer in the peripheries (Rikap, 2021).

While skills are important, the main obstacle to product upgrading cited in interviews and the literature is a lack of access to markets, both to customers and to capital, which is directly related to Serbia's position in the global economy. As argued by Mateescu et al (Mateescu et al., 2024) in their research on the Romanian IT sector, outsourcing countries are not the same as high-income markets, nor are they where protected intellectual property resides. As per GPN logic, these are usually located in higher-income economies, where most of the value is captured at the top of the network.

The most detrimental factor for developing digital products or scaling start-ups is perceived to be access to finance, or in particular venture capital. While most venture capital is concentrated in the U.S., with Europe trailing behind, a clear division between Eastern and Western Europe emerges, with Western European countries having several times higher investment levels (see the graph for 2024, Q3, below). Even within Eastern Europe, Serbia has exceptionally low

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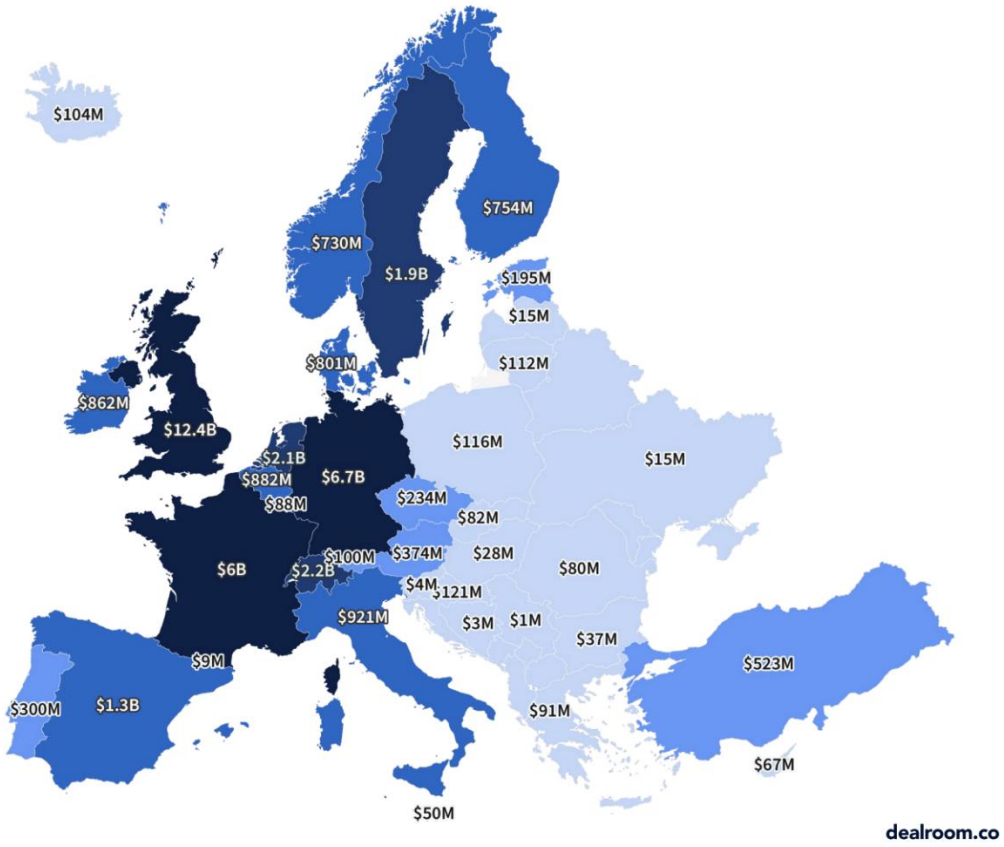
venture capital investments. When accounting for the entire year of 2024, the Western Balkans region, including Serbia, received only $11 million in venture capital, compared to hundreds of millions in EU countries such as Czechia, Poland, Hungary, and even Croatia.[156] This cements Serbia firmly in the EU's periphery when it comes to access to capital. According to research conducted in Serbia, the lack of capital is seen as the main obstacle to developing and marketing digital products.[157]

Figure 5 Venture capital investments in Europe – 2024 Q3



Source: Dealroom.co. Retrieved in December 2024

[156] Analysis conducted by The Recursive: https://therecursive.com/cee-region-funding-tops-e1-15b-in-h1-2024-czech-republic-is-leading-the-way/?utm_campaign=Newsletter&utm_medium=email&_hsenc=p2ANqtz-_xCtCRlJF49D2sO1t2wz_Xv3xv6rbO67tU0KdF3tdSNNOdlka8Xt0fSV2zBK4GeIig57-7-dd23PJnDcXesRXs7yu1rOlrn5vPZLk2PQFGFvX6VLc&_hsmi=321734646&utm_content=321734646&utm_source=hs_email

[157] As per Startup Scanner data: https://www.preduzmi.rs/en/startup-scanner-2024/

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The lack of capital is reflected in the inability to focus on product development. The difference between outsourcing and product development is that, in outsourcing, companies can immediately generate income as clients pay for regular services. Developing products is a much longer process that requires significant investments before their launch. Even after that, it is uncertain if the product will sell. Therefore, this form of upgrading is an exceptionally risky undertaking. According to Zvezda CEO's interview in a podcast[158]: "It is hard to keep people from immediately productive activities and put them aside for risky projects. Companies like ours would always prioritise money inflow as we don´t have sufficient capital to risk."

Even when companies manage to develop a product and sell it, the lack of capital on financial markets further hinders their development. A prominent expert on the IT market in Serbia explained to me in an interview[159]:

> The perspective for the development of domestic products is bleak. Every product company or start-up here faces serious constraints when it comes to accessing the capital needed for further expansion. You cannot get bank loans or venture capital investments here in Serbia. You can only do that on the international scene, particularly in the U.S. That is why Serbian start-ups have to sell. As soon as they reach 5,6 million euros in turnover, they come under the radar of large international companies. If it passes 10 million euros, it will be sold for sure on the U.S. market. By shifting ownership, the companies are also moving their capital and knowledge there. After that, the budget left in Serbia is for salaries only, and the businesses of these companies become more like an outsourcing model.

As a consequence, many successful Serbian start-ups still hire Serbian labour, but move their capital base and pay capital taxes in other locations.[160] According to an expert from the sector I interviewed, "It is not even a question: every successful start-up will sooner or later be acquired by foreign companies."[161] There are numerous examples of this trend. The most valuable local start-up, Nordeus, was acquired for $750 million. Another large start-up, Frame,

[158] Previously mentioned public interview
[159] Interview conducted in December 2024
[160] Jovana Rabrenović, "„Nordeus" neće platiti porez na kapitalnu dobit," Politika Online, accessed July 10, 2022, https://www.politika.rs/sr/clanak/480636/Nordeus-nece-platiti-porez-na-kapitalnu-dobit.
[161] Interview conducted in December 2024

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was acquired for $165 million. This list also includes other valuable start-ups, such as 3Lateral and Devana, all of which were sold to major multinational software companies, primarily based in the U.S. [162] As a result of these dynamics, the main ambition of local IT entrepreneurs is to develop and sell their own companies. Selling a company is generally celebrated as a success of the local IT industry (Živković et al., 2018).[163]

This aligns with the general logic of technology production networks as described by Rikap (Rikap, 2021). Essentially, key technology companies located in the economic core have a monopoly over intellectual property, innovation capacities, and data. They systematically internalise high-value and high-knowledge functions to create products that yield product rents, while externalising production to economic peripheries through outsourcing. As a consequence, these companies dominate the market with their products, preventing smaller companies from entering it to compete. Even if companies do manage to create innovative products, they are bought out by monopolists and sucked into their networks. This mechanism of rent capture is thus detrimental to the reinforcement of the global economic structures in the tech sectors.

Ultimately, product upgrading appears much more challenging in the semi-peripheral context, with a range of obstacles blocking it, mostly stemming from global economic structures. Thus, companies such as Zvezda have less success in utilising some of the semi-peripheral advantages. As argued earlier, most of the enabling factors for the development of high-value digital products are not present in Serbia. These rents, based on intellectual property that could generate immense value-capture opportunities, are ultimately concentrated in the core

[162] "Domaći IT-ijevci zadržavaju autonomiju kad firmu kupe stranci," Nova Ekonomija, May 28, 2021, https://novaekonomija.rs/vesti-iz-zemlje/domaći-it-ijevci-zadržavaju-autonomiju-kad-firmu-kupe-stranci; "The Serbian IT Market Is Worth Three Billion Euros," https://serbia-business.eu, June 8, 2021, https://serbia-business.eu/the-serbian-it-market-is-worth-three-billion-euros/.
[163] "Best Year for Serbian IT Netokracija," accessed July 10, 2022, https://www.youtube.com/watch?v=RIy72QstU9c.

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economies with access to large capital and markets. Thus, it is crucial to also consider the more structural position of the economy in the broader division of labour, with clear limits to upgrading for semi-peripheral sectors.

Enabler, not a developer: state and the economic development

Upgrading and economic development are not only individual-firm phenomena, and in GPN, the role of the state is seen as essential to economic upgrading (Coe & Yeung, 2015; Horner, 2017; Narayan, 2025; Noronha & D'Cruz, 2016). Previous literature has identified a wide range of policies that the state introduced to support the IT sector's movement towards higher-value activities. The most relevant example is the U.S. as an 'entrepreneurial state', which supported innovation at the core of the sector by taking on research and development and risky investments itself, leading to a wide range of innovations that spurred growth in the digital economy (Mazzucato, 2011). Other countries like Brazil and China supported such processes by fostering links between ICT and other sectors, such as hardware and manufacturing, or by using public procurement to accelerate sectoral development (Aridi et al., 2021; Medve-Bálint, 2024). However, as I argue, the role of the state in Serbia has been much smaller, with limited and contradictory attempts to support upgrading, not moving beyond the provision of education and the absorption of costs discussed in previous chapters.

As outlined earlier, states can assume multiple roles in GPN, serving as facilitators, regulators, producers, or buyers (Horner, 2017). These mechanisms are used either to attract more foreign capital or to improve the position of domestic capital by facilitating local linkages. Ultimately, the states meet the needs of the key firms in GPNs and embed them domestically to also ensure value capture locally, or support the upgrading of domestic firms (H. W. Yeung, 2015). However, the state's role in upgrading depends on a range of economic and political factors. In particular, the role of the Serbian state should be viewed through the structural lens of uneven

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development and the predominance of lower-level outsourcing, as well as through the broader political-economic state model outlined in the introduction. In particular, dependence on foreign capital, lack of economic power, state capacities, and the development agenda are embedded in its political-economic model.

The Serbian state played a limited role in sectoral upgrading and lacked a coherent development agenda. As argued by sectoral experts, concerns with longer-term sectoral development were not initiated by the state but rather by companies and company associations (Matijević & Šolaja, 2020). According to an interview with a representative of one such association, "The story about development was pushed by companies, not by the state, which was disinterested and had no knowledgeable people." However, as argued by several experts I interviewed, such as the former president of the Digital Serbia Initiative, a key company organisation, the state's role should be crucial in these processes: "For increasing the share of added value, the large resources of the state and strategic planning are necessary, and individual companies can do only that much."

According to interviews and analyses of IT policies, it could be argued that governments' active involvement in the sector before 2013 was almost non-existent (Matijević & Šolaja, 2015), limited to passive absorption of costs through taxes and the continuation of education provision. In 2013, the government introduced several strategies and initiatives to support the sector, but, according to reports, their impact was limited (Matijević & Šolaja, 2015).The state took on a more active role only during the office of Ana Brnabic as prime minister, from 2017 to 2024. During this period, various strategies and initiatives were introduced, and several key legislative measures were enacted to support sectoral development.

Development of key research infrastructures was one of the central initiatives. In 2015, the first part of the broader innovation infrastructure was the opening of Belgrade's Science and

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Technology Park. Novi Sad's technological park was unveiled in early 2020, and two more are currently under construction in Niš and Čačak, with a collective investment of 70 million euros[164]. The state also supported the expansion of technical universities and their research capacities in Belgrade and Novi Sad,[165] as well as the construction of a data centre in Kragujevac.[166]

The state also supported the development of start-ups through direct financial support. Through the Innovation Fund of the Republic of Serbia, the state started running grant programmes that co-finance R&D and commercialisation. Furthermore, it has launched Katapult - a state-funded accelerator for start-ups that provides mentoring, grants, and support for entering international markets.[167]

Furthermore, the state implemented targeted support and sectoral development through tax policies. These include capital gains tax exemptions aimed at encouraging investment in domestic companies with intellectual property, and a 50% exemption for individuals who reinvest income from digital asset sales into local companies or investment funds. Additional incentives include a 30% corporate income tax credit for investments in startups, full income tax and social security exemptions for startup founders (up to 80% tax exemption on income from IP commercialisation), and R&D incentives such as double deduction of R&D expenses and 70% exemptions on income taxes for R&D staff.[168]

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[164] Emerging Europe (2022= IT Landscape report . Available at: https://emerging-europe.com/it-landscape-report/
[165] "Универзитет у Новом Саду 'Софтверска долина,'" *Градске инфо* (blog), December 19, 2021, https://gradskeinfo.rs/univerzitet-u-novom-sadu-softverska-dolina-19-12-2021/.
[166]The official website of the data center: https://www.ite.gov.rs/tekst/sr/5273/drzavni-data-centar.php
[167] Innovation Fund of the Republic of Serbia: https://www.inovacionifond.rs/cir/
[168] As per authors analysis of key regulations

While appearing substantive at first, the interviews I conducted with experts criticise these changes, arguing that there was little systematic strategic initiative, that existing policies were based on the prime minister's personal engagement, and that some of these policies were never implemented. According to interviews, most of these originated in the private sector rather than the government, as sector representatives had direct contact with the prime minister's cabinet, influencing these policies. Crucially, with the change of government in 2024, this communication ceased almost entirely. According to a representative of one IT company association;

> The age of Ana Brnabic was the golden age because they had concerns about the sector, and someone was there to respond to our questions. Now the goals have completely shifted, and we are lobbying just to get one person in the cabinet who would deal with this topic.

Furthermore, according to interviews, many of these measures never materialised, revealing the contradictory nature of state support. For example, the promised tax cuts for R&D staff's income have not taken effect for several years and are still not in effect in 2025. Another example was that while the companies received employment subsidies during the COVID-19 lockdown to support the sector's operation during downtime, in 2025, they were forced to pay them back at a much higher rate because they had changes in the workforce in the meantime, either a change in the number of people replaced.

Similarly, in 2022, the state committed to supporting tech companies in relocating their high-skilled employees from abroad (primarily Russia and Ukraine) to Serbia at the onset of the war to attract high-value companies. While companies counted on that support, it was only delivered initially, and the state has not paid since August 2023, owing many companies sums of up to hundreds of thousands of euros. This sparked widespread dissatisfaction and even the relocation of some of these companies. A newspaper article on this issue quotes some of the company owners who consider relocation: "After not receiving subsidies, a few European

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countries have become more attractive because the expenses are similar and there is a higher certainty of what can be expected from legislation". Another owner states how "It has become more efficient to move projects to other locations with a more stable business climate, like Poland or Bulgaria".[169]

Finally, some of the state's measures actually undermined the upgrading process, primarily through PR campaigns. While talking about the development, it was at the same time advertising the country as a large pool of cheap and skilled labour, reinforcing its image as a low-level outsourcing location (Arandarenko, 2021; Johnson, 2019; Matijević & Šolaja, 2020).[170] According to Zvezda´s CEO:

> The Serbian state was ringing all the bells, announcing to foreigners that Serbia has high-quality, low-cost engineers, and actively campaigning for the influx of foreign companies. This was one of the reasons Serbia was recognised as a cheap-labour destination, with lower-end work and little development of local products and startups. I think this is a shame. The state would have profited much more from stimulating local companies.

Moreover, the state also provided subsidies to some foreign companies for hiring software developers, actively undermining local firms' access to labour. In particular, large subsidies per employee were given to a large German industrial firm that hired over 1,000 IT workers in Serbia amid labour shortages. Later, due to resistance from local companies, the state abandoned these policies, further reinforcing its contradictory role.

Thus, ultimately, the role of the state, while significant for the integration phase of the sector, was much smaller in the upgrading processes, due to both structural limitations and a personalised, contradictory approach to economic development. While outlining some strategies and introducing measures, these were insufficient and often contradictory from the

[169] Interviews from a newspaper article, not conducted by author. Available at: https://www.euronews.rs/biznis/biznis-vesti/185652/it-sektor-u-srbiji-trpi-posledice-ukidanja-subvencija/vest

[170] Also per analysis of one of the key experts on the sector: "Koje Su Granice Rasta Domaćih IT Preduzeća? | SITO," accessed July 8, 2022, https://www.sito.rs/koje-su-granice-rasta-domacih-it-preduzeca/.

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firm's perspective. This way, while the state enabled value capture for subcontracting companies, multinationals, and workers mostly through cost absorption, it played a much more limited role in increasing value capture prospects and upgrading local companies. This resonates with the conceptual considerations of the state outlined previously – its potential to guide development ultimately depends on the sector's negotiating power, internal political processes, and the existence of a coherent developmental agenda.

The possibilities of value capture and upgrading in the semi-periphery

What can the upgrading attempts of Zvezda and other companies say about the possibility of value capture in global production networks? As per the analysis conducted in this chapter, I argue that, firstly, it illustrates strong economic structures that both hinder and enable upgrading processes and increase value capture for firms in semi-peripheries. Secondly, it demonstrates that the role of the state in upgrading should be considered in light of its position of power and its capacities to guide developmental processes. However, I also show how some individual companies, such as Zvezda, still manage to navigate these structural constraints and increase their value capture.

This chapter has illustrated the hierarchical nature of networks in three main ways. Firstly, there is intense competition for low-level, labour-intensive tasks, primarily from low-income economies. Secondly, there is significant competition for rent capture at higher levels of production, and it is difficult for low-tier companies, which often lack market access, knowledge, and capital, to upgrade in an already consolidated market (Blažek, 2016). Thirdly, the dominance of multinational firms tightens their grip on local markets and on access to labour, making it difficult for local firms to compete and upgrade. Finally, as seen in the previous sections, the ability to accrue rents and capture value is closely related not only to position in global production networks but also to physical and cultural proximity to core

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countries and state capabilities. These insights highlight the need to incorporate the notion of the semi-periphery into the analysis, as it helps explain the middle-income trap companies find themselves in, as well as the particular advantages they have due to their proximity to core economies.

When it comes to functional upgrading, Zvezda and other companies manage to build close relationships with clients and develop a brand because they are located in Europe. This gives them cultural, historical, and linguistic ties with client countries, unlike countries in Africa or Asia. In Zvezda's case, the CEO actively used those tropes to differentiate his company from cheaper outsourcing locations. This way, instead of relying on simple brokering and labour rents, the company uses its semi-peripheral position to create a specific kind of brand rent unavailable to most companies in economic peripheries.

As for product upgrading, these structural constraints stemming from uneven geographies are even more relevant. As explained in the previous section, most product companies are based in the core economies. When Serbian companies reach a certain scale, they also tend to relocate to these countries to expand further. This is because being located in the core primarily provides access to markets and capital, as well as to knowledge. This way, the semi-peripheral position of Serbia not only prevents it from competing with product companies from the core economies, but also conditions the transfer of their legal seat and intellectual property to these countries. This way, the uneven value capture across territories is being reproduced. Furthermore, many semi-peripheral states lack coherent development agendas and resources to guide their upgrading processes.

Going beyond generalising arguments about development, I have shown the value-capture possibilities for companies. The local value capture then depends on both structural factors shaping their opportunities, such as those tied to the middle-income trap, as well as the ability

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of companies to stay ahead of the competition and capture rents based on their preferential positions in networks. Due to the dominant control of high-value functions within networks by companies from the core economies, the consolidation of local markets at the hands of multinationals, as well as the series of constraints imposed on companies from middle and low-income economies, it is necessary to account for theoretical perspectives explaining broader uneven development beyond the simple network analogies, as argued in the introduction. Still, while it is crucial to focus on structural inequalities and interrelationships of value capture trajectories on the global level (D. Quentin & Campling, 2018; Selwyn, 2014), it is important not to view them in a deterministic and static way, but rather as conditions of possibilities within which firms, workers, and states act in the networks (Werner, 2019). As I have illustrated, some individual companies navigate these economic structures, taking advantage of different structural conditions and managing to establish rents and capture value.

While this chapter focused on the possibilities for firms to capture value during the expansion phase of IT sector development, the next chapter will focus on another key actor in the sector - labour.

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CHAPTER 5: THE EMERGENCE OF THE LABOUR ARISTOCRACY: VALUE CAPTURE TRAJECTORIES OF IT WORKERS

As illustrated in the previous chapter, the expansion phase of the Serbian IT sector was characterised by the proliferation of companies and freelance workers, market consolidation by multinationals, and increased competition for labour. This led to higher labour costs and significant value capture opportunities for workers. While the thesis so far has explored value capture dynamics from the perspectives of firms, labour has been mostly conceptualised as a passive victim of value capture.

However, as argued in the introduction, workers in Serbia greatly benefited from IT outsourcing, as work in IT became a synonym for high salaries and exceptional working conditions, leading to perceptions of IT workers as a privileged social stratum. On top of salaries a few times higher than the average and comparatively better work conditions in this sector, the work in IT has also enabled a form of social mobility mostly unavailable in other professions. This brought economic opportunities for tens of thousands of workers in an otherwise opportunity-scarce environment.

As a consequence, IT workers in Serbia can be seen from two contradictory positions: cheap from the perspective of clients and as a privileged labour strata. On the one hand, as shown in previous chapters, workers in the sector receive a fraction of the outsourcing budgets and earn significantly less than their peers in core countries. On the other hand, they are also able to capture significant value from these arrangements, well above what they could otherwise in the local market.

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In this chapter, I will explore how workers capture value in the outsourcing arrangements and what enables it. I will analyse how workers capture value both as a result of structural market factors, including broader economic upgrading, competition for labour, and large software budgets, and through their active navigation of the market and exercise of market power. I show how, rather than relying on traditional collective bargaining or unionisation, software developers primarily engage in individual market strategies to improve their conditions. In previous chapters, I mostly explained value capture from a firm's perspective in terms of profits or rents. In this chapter, I examine value capture from the workers' perspective through salaries and improvements in working conditions, as I explain in the theoretical section below. Conceptually, I will shift the focus on the role of labour in the processes of production, both as a source of value and an active agent, but also illustrating how labour struggles can be individual, rather than collective, depending on the structural position of workers.

After introducing the theoretical framework, I will first discuss the proliferation of IT labour and the opportunities for workers that the sector enables. Following that, I will explain the structural factors that enable workers to capture value, as well as the individual strategies they use to further their market position. The chapter is based primarily on the interviews with workers, representatives of workers´ organisations, as well as some managers and experts.

Value capture by workers beyond social upgrading

So far, the thesis has focused on how firms capture value from the perspective of firms. But how do workers capture value, and how do they improve their outcomes in the outsourcing arrangements? In the GPN literature, this process is mainly described through the concept of social upgrading. Social upgrading can be defined as sustained gains in pay and employment quality - i.e., higher wages and more secure working conditions, together with strengthened rights and protections (Barrientos et al., 2010, 2011). Some critics argue that the concept of

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social upgrading is conceptually vague and overly technocratic, relying on broad and inconsistent indicators (Milberg & Winkler, 2011), that it often masks uneven gains across different types of workers (Barrientos et al., 2010, 2011), and that it assumes improvements depend on optimal governance, underestimating the importance of struggles (Selwyn, 2013).

Conceptually, in the mainstream variant, this notion primarily relies on the assumption that improvement in work conditions stems from the economic upgrading of firms, while more critical scholars argue that this process of upgrading happens through organised labour struggles or interventions of unions or other labour governance bodies. However, as I will show in my thesis, the improvement of labour conditions in the IT sector, while certainly contingent on economic upgrading and competition dynamics, does not rely on collective labour struggles. Rather, it is completely facilitated by individual struggles of workers attempting to obtain more value from their work in the market. Ultimately, workers behave more similarly in small firms, individually competing on the market and capturing value through various mechanisms rather than in organised labour protected by institutions outlined in the literature. This argument is further reinforced by the fact that many of the workers in the sector are self-employed and are actually incentivised to act like small entrepreneurs. Thus, while the value capture dynamics I observe resemble the notion of social upgrading in explaining the outcomes – improved work conditions and salaries, the mechanisms leading to these outcomes are markedly different. Thus, instead of the notion of social upgrading, I will use the term value capture to explain distributional dynamics from the perspective of workers.

The global production network literature (GPN) is largely firm-centric, treating labour as a production input, included or excluded from networks through demand- and supply-driven mechanisms (Newsome et al., 2017a; P. Taylor et al., 2013). In the same manner, improvements in labour conditions in the GPN literature are studied mainly from a firm-centric perspective. According to the mainstream perspectives in this approach, the economic upgrading of firms,

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discussed in the previous chapter, should lead to social upgrading. This means that the more value a firm captures, the more it will spill over to workers (S. Barrientos et al., 2011; Coe & Yeung, 2015; Graham et al., 2017). The implication is that, over time, as the market matures and productivity increases, workers should be able to capture more value from their work.

Some critical GPN scholars argue that these processes are not necessarily related and that social upgrading depends on struggles within the network and the relative power of companies. This can include both the struggle between labour companies, the diminishing monopsony position of established firms, state regulation, and labour struggles for better conditions (Bair & Werner, 2015; S. Barrientos et al., 2011; Newsome et al., 2017b). The critics point out that this labour perspective is particularly missing from the GPN perspective and call for further research on this issue. In particular, there are calls to account for how workers actively renegotiate and reshape their positions within global production networks (Herod, 1997, 2001; Herod et al., 2007).

I rely on this literature and also further expand it. Firstly, while I acknowledge the correlation between the sector's maturation, rising wages, and social upgrading, I argue that, more importantly for improved working conditions, is the competition for labour that ensued during this expansion phase. Secondly, I am contrasting my findings with the usual arguments about upgrading of labour conditions through collective organisation described in the literature (Herod, 2001; Selwyn, 2014). As opposed to collective organisation, I show how Serbian IT workers primarily capture value individually. While I argue that social upgrading happened on the broader level in the sector, it happened primarily at the individual level and cumulatively, rather than collectively.

But what does the workers' ability to capture value rest upon? Previous scholarship on labour power (Silver, 2003; Wright, 2000) focused on how different forms of power determine the

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success of collective worker struggles. These include marketplace power based on the demand for workers' skills, disruptive power or the ability of workers to disrupt production, and associational power or their ability to organise collectively. In contrast, in this chapter, I focus on the centrality of workers' individual market power and their ability to be mobile in the market (James & Vira, 2012; Smith, 2006). The power of workers to move between firms, and demonstrate the threat of leaving the company, serves as their main leverage (Mayer-Ahuja & Feuerstein, 2008). On top of this previous conceptualisation of market mobility power, I also pay special attention to workers' ability to transcend local power geometries through remote work and client connections. This is a unique contribution of my thesis.

Still, this power of workers should not be overestimated; rather, it should be seen within the specific structural conditions of the developmental phases. This means that their power depends on their embeddedness into production networks and broader power relations (Coe & Jordhus-Lier, 2011). The temporary market mobility of workers, as well as their fragmentation within production networks, also incentivises them to pursue individual rather than collective value capture strategies.

Conceptually, the workers are actively reworking the conditions under which they labour to improve their material conditions (Katz, 2004). This cannot be viewed as labour resistance as it does not change structural relations between labour and capital. Instead, workers are recalibrating these relations and moving positions to grab a larger share of the production value (Herod, 2001). Consequently, as workers seek a more optimal distribution of gains in global production networks, they are actively shaping the geographies of capitalism (Bair & Werner, 2015; Coe & Jordhus-Lier, 2011; Herod, 2001). Thus, while capital seeks to capture more value from unevenly developed geographies, so does labour, leading to a constant tension between capital accumulation and the workers' practices of survival and social reproduction.

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Labour aristocracy: high salaries, social mobility and proliferation of workforce in the Serbian IT sector

While it was only a marginal profession during the 1990s and early 2000s, mainly in the amateur sphere, the IT workforce grew with the rise of the outsourcing industry. From several thousand IT experts in the early 2000s, the IT sector became one of the country's highest-employment sectors. In concrete figures, in 2025, well over 120,000 workers worked in the sector,[171] compared to 2008, when the sector had around 10,000 workers (Mijačić et al., 2011), representing a twelvefold increase. While this number includes different skill profiles within the sector, it was estimated that in 2022, there were around 60,000 software developers (Matijević & Šolaja, 2022), a figure that has increased significantly since then. The boom in the sector is also reflected in the increase in the number of IT graduates, with, for example, a 15% upsurge from 2020 to 2022, significantly above the EU average. This clearly reflects that students perceive opportunities within the sector. Notably, the high number of women entering the field also suggests that the work is highly desirable. As of 2023, women constituted 23,5 % of employees in the sector, compared to the EU average of 19.1%.[172]

The proliferation of the IT workforce also happened in other Eastern European outsourcing countries (Guga & Spatari, 2021; Hardy & Hollinshead, 2011). The IT sector created employment for thousands and introduced a new career trajectory for tens of thousands of young people in the region. Importantly, the sector offered salaries significantly above local standards, as well as prospects for social mobility.

As explained previously, low salaries and widespread poverty were endemic in Serbia for most of its recent history. With deindustrialisation and the breakdown of the socialist economy, the

[171] As per government website advertising the IT indusry: https://welcometoserbia.test-uzda.gov.rs/ubrzani-rast-it-industrije

[172] As per data analysed by 24sedam news portal: https://24sedam.rs/biznis/privreda/264231/koliko-srpski-it-zaradi-u-inostranstvu-a-koliko-kod-kuce/vest

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vast majority of employment opportunities offered exceptionally low salaries compared to European standards. This has changed significantly with the proliferation of software outsourcing in the country. In the first decade of the 21st century, at the onset of software development outsourcing in Serbia, salaries in the sector were comparable to those of other higher-skilled jobs, amounting to only a few hundred euros. Over time, this changed: wages in the IT sector have surged significantly, even approaching those in high-income countries.

The trend of wage increases is captured in data from a research company that has been conducting surveys of the Serbian IT sector for the past 9 years.[173] The research shows a steady increase in average salary from 2013 to 2023, tripled, with a trend of sustained growth. Only in 2023 did wages grow by around 10% compared to the previous year, despite the acknowledged market crisis. Furthermore, many workers started working remotely for foreign companies for significantly higher wages, which is unaccounted for by these statistical indicators.[174]

The average salary in the sector in October 2024 was officially around EUR 2,400. This means that the average net salary in the IT sector is around three times higher than the average salary in Serbia.[175] According to the Serbian Bureau of Statistics, for instance, the IT sector has one of the highest added value per employee, being double the country's average. [176] Importantly, these figures might be underestimated due to underreporting, tax evasion, and comparatively high salaries that self-employed cross-border remote workers can earn.[177] Although there are significant wage differences between junior and senior developers, their pay still exceeds that

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[173] As per FenixHR study: https://www.fenixhr.com/index.html
[174] As per calculations by Nova Ekonomija news portal: https://novaekonomija.rs/vesti-iz-zemlje/prosecna-neto-plata-oko-86-000-dinara-programerska-preko-2-000-evra
[175] ibid.
[176] As per calculations by Forbes news portal: https://forbes.n1info.rs/novac/cime-se-bavi-najproduktivniji-radnik-u-srbiji/
[177] As per calculations by Bloomberg Adria news portal: https://rs.bloombergadria.com/biznis/kompanije/72708/koliko-su-plate-u-srpskom-it-ju/news

in other sectors and grows faster (Matijević & Šolaja, 2022).[178] Thus, in the local market, the value capture potential for workers, expressed as income from work, is substantial.

The workers in Serbia not only experienced higher salaries but also significantly better working conditions in the sector than those available locally. While providing working conditions similar to those in other sectors in the early 2000s, the IT sector diverged as outsourcing expanded and multinational companies entered the market. According to the above-mentioned longitudinal study, the average number of benefits workers received over the past decade increased from 7 to 25. This includes benefits such as private health insurance, gym passes, catering, and a training budget. This is in line with the growing pressure to meet workers' benefit requests[179] amid increased competition for labour, as explained in the following section.

Ivan[180], who was working as an IT expert in a bank in the late 2000s and later switched to an outsourcing company, explains this shift:

> Work in IT was like any other job back then, poorly paid with poor working conditions. Early informal IT outsourcing was extremely exploitative. Those with contacts who could find clients were exploiting young people who knew how to code for miserable salaries and long working hours, as there were no other options… Working for serious outsourcing companies was a real game-changer then, especially foreign ones. I remember how shocked I was when I started working for a Dutch outsourcing company in a nice, comfortable office, earning a salary higher than I could ever dream of. This was a huge game-changer.

Sergej[181], software lead and manager, shares this sentiment: "For us, millennials, 500,600, hundred euros as a starting salary was something we could only dream of only several years ago, and only seniors would earn over 1000. Now that has changed significantly, and companies are just throwing money at workers."

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[178] As per calculations by Forbes news portal: https://forbes.n1info.rs/biznis/pad-broja-oglasa-na-it-trzistu-trend-ili-strateska-promena-pri-zaposljavanju/
[179] As per FenixHR study: https://www.netokracija.rs/fenix-it-istrazivanje-2023-207483
[180] Interview conducted in April 2022. Ivan is a senior software developer, starting his career in the early 2000s
[181] Interview conducted in July 2023. Sergej is a senior software developer currently working remotely in a US startup remotely, but previously worked as a manager in a local gaming outsourcing firm

The IT sector not only offered higher salaries and better working conditions but also enabled social mobility. This could be understood as an improvement in individuals' material standing relative to their previous economic position. As argued earlier, with low average salaries and widespread poverty, IT salaries directly enabled social mobility and entry into the middle class for many young people. As software development work does not require significant economic, social, or cultural capital, unlike some other high-skill professions, and companies usually do not require completed university degrees, this line of work was widely available to practically anyone who could learn to code. This is different from countries such as India (Aneesh, 2006, 2015; Upadhya, 2016), where such work is mainly reserved for middle- and higher-class individuals with English-language skills and access to education, electricity, and the internet. In Serbia, these skills are widely available through widespread free public education and existing infrastructure. This can be attributed to the specifics of post-socialist semi-peripherality discussed throughout the thesis.

A labour market expert in Serbia[182] explains these social mobility opportunities in the following way:

> Work in the IT sector is one of the few opportunities for a decent life for those at the bottom of society, as those without connections are completely marginalised here. In most cases, those with family connections and capital do not code. Instead, they do business, get jobs in the public sector, or go abroad. The IT sector offers mobility opportunities for bright young people without such privileges.

Another software developer I interviewed shares a similar sentiment: “It is the only white money in Serbia. What will I do if my child is not a software developer?” Many of the software developers I spoke with come from lower classes or rural areas, from families without a higher educational background. A significant fraction of them are also migrants from Bosnia and Montenegro who came to Serbia in pursuit of a better life, such as Krstan. He came to Serbia

[182] Interview conducted in February 2022. The interviewee is an HR expert and a CEO of one of the largest IT employment platforms in the region, having access to one of the most comprehensive databases on labour trends in the sector.

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to study because his family believed there were no opportunities for him in Bosnia. Others, like Dragan, a software tester from a village in northern Serbia, come from poor families with few economic prospects. Before working at Zvezda, he worked as a waiter because he could not afford to attend university. Ivana, now a senior software developer who later migrated to Austria, also came from a rural area in central Serbia. Working in the IT sector in Belgrade enabled her to experience a middle-class lifestyle for the first time and also support her family. A large number of developers I interviewed share similar stories about social mobility.

On a broader level, work in IT, whether through companies or online, offered a rare pathway to a decent life. Previously, such living standards were only possible through migration, entrepreneurship, or crime (Johnson, 2019a, 2019b). This has changed completely with the rise of software outsourcing. In the words Johnson writing about social mobility in Serbia, "The true benefit of the IT sector is showing young people how they can still make a decent living without corruption and crime in Serbia. That was unimaginable previously." Previous research on social mobility in Serbia also singles out work in the IT sector as the primary source of social mobility for youth in the country, which has enabled them to radically transform their lifestyles and escape the grim reality of the Serbian labour market (Johnson, 2019a, 2019b). According to the same research: "Programmers and others with livelihoods embedded in the digital economy and dependent on the global market are able, to a great extent, to circumvent the nepotism, clientelism, bureaucracy, and state-level instability that affects nearly every other worker in Serbia."

How did the IT sector enable such opportunities for workers? Where do high salaries and social mobility come from? And how does it fit with the developmental phases of the IT sector? In the following sections, I will disentangle both broader economic and political factors and the value capture trajectories of workers that enabled the rise of this advantaged labour strata.

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Structural factors behind IT work proliferation

In this section, I will analyse the structural factors that have led to the proliferation of the IT workforce in Serbia and the increased value-capture opportunities it offers. I show how the growth in the number of workers was a consequence of rising labour demand globally, leading to competition for workers, lower entry barriers in the sector, and the expansion of educational programmes.

Scramble for labour and rising labour costs

As outlined in the previous chapters, the period after the global financial crisis and Eurocrisis, from around 2012 onwards, led to explosive growth in demand for software development globally due to quantitative easing and advancing digital transformation (Srnicek, 2017; Staab, 2024). In the Serbian context, this also meant the arrival of multinational companies, the expansion of subcontracting firms, the emergence of start-ups, and the proliferation of freelancers. Taken together, tens of thousands of software development positions opened, and competition for scarce workers increased.

The expansion of multinationals and the shift towards higher-value activities by local firms led to partial economic upgrading of the sector, as described in the previous chapter (Blažek, 2016; Coe & Yeung, 2015). In this context, start-ups can raise large funding rounds or develop their own highly profitable products, subcontractors can acquire more valuable projects, while branches of large, profitable multinationals usually have much higher profits due to scale and ownership of major IT products. Such upgrading beyond simple outsourcing can also mean potentially higher labour budgets. This created a space for higher salaries than in established outsourcing models, such as staff augmentation, discussed in Chapter 3.

According to the mainstream GPN conceptions outlined previously, such economic upgrading leads to social upgrading and to improvements in working conditions, including higher salaries.

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While my research has shown that wages and working conditions indeed rose simultaneously with the economic upgrading, this relationship is more complex than simple spillovers on workers. My findings suggest that struggle is crucial in these processes, primarily competition between companies for scarce labour, but also in workers' struggles to attain greater value from their work. While the first struggle is described in this section, the latter one will be described in the second section of the chapter.

The consistent finding of my research, based on interviews with companies and experts, is that the rise in salaries is primarily due to competition between companies. The companies were forced to raise wages to hire increasingly scarce workers amid fierce market competition. According to the owner of the major IT employment platform and an HR expert[183]:

> Due to the high global demand for developers and the competitiveness of Serbian workers, the demand for them surged. New companies are constantly coming, and local teams are growing as the volume of work rises. Simply put, there are not enough engineers on the market because demand is growing faster than supply.

While demand for workers had been growing rapidly since 2012, the surge was particularly pronounced after the start of the Covid-19 pandemic in 2020-2021, at the peak of global demand for software developers.[184] This surge in demand and related labour shortages received significant media coverage.[185] In concrete figures, according to the biggest IT job portal in Serbia, HelloWorld, in 2021, the number of job posts for software developers increased by 65% compared to the previous year.[186] This growing demand was followed by only a 25% increase

[183] Interview conducted in February 2022. The interviewee is an HR expert and a CEO of one of the largest IT employment platforms in the region, having access to one of the most comprehensive databases on labour trends in the sector.
[184] As per data analysed by one of the most influential IT blogs: https://newsletter.pragmaticengineer.com/p/zirp-software-engineers
As per the following new sources: https://bif.rs/2023/07/dejan-djokic-asee-srbija-uprkos-otpustanjima-nastavlja-se-trend-rasta-domace-it-industrije/; "Potražnja za IT kandidatima porasla za čak 65% u 2021!," HelloWorld.rs, accessed July 8, 2022, https://www.helloworld.rs/blog/Potraznja-za-IT-kandidatima-porasla-za-cak-65-u-2021/14196.
[185] Zlatko Čonkaš, "PLATE I DO 2.000 EVRA, A RADNIKA NEMA Izvoz softvera mogao bi da dostigne 1,4 milijarde evra, a NEDOSTAJU INŽENJERI," Blic.rs, accessed July 10, 2022, https://www.blic.rs/biznis/moj-novcanik/plate-i-do-2000-evra-a-radnika-nema-izvoz-softvera-mogao-bi-da-dostigne-14-milijarde/c8drjfb.
[186] "Potražnja za IT kandidatima porasla za čak 65% u 2021!," HelloWorld.rs, accessed July 8, 2022, https://www.helloworld.rs/blog/Potraznja-za-IT-kandidatima-porasla-za-cak-65-u-2021/14196.

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in job applications, leaving a large gap between labour supply and demand.[187] According to some estimates, in the same period, the number of software developers required for the market grew by only 10% per year.

The demand was particularly tied to senior developers. Experienced programmers, project leaders and senior software architects are the most in-demand assets in the sector. This is because they require little training, can take on more complex work, and are overall more profitable (Matijević & Šolaja, 2022). As the employment platform owner explains[188]:

> There are not enough seniors on the market, and therefore there is an increasing fight for them by the companies. A good senior gets 3-4 job offers per week from local recruiters, recommendations, headhunting agencies, or LinkedIn. Basically, the offers are coming in on their own.

There has also been a sudden increase in demand for Serbian software developers from companies outside the country, leading to a proliferation of cross-border remote work (Baldwin, 2016). In addition to working through platforms, Serbian workers were also working remotely and full-time for companies located outside of the country. In contrast to platform freelancers, these workers worked regularly for companies located abroad, but without a work contract, mostly as self-employed. This growth of the cross-border remote work in Serbia also occurred particularly since Covid-19 (Radonjić, 2022). Data obtained from the local job portals indicates a significant increase in remote software development positions. For example, on a major Serbian IT employment platform,[189] in 2022, 15% of all job ads were for remote positions by companies not located in Serbia, compared to less than 1% in 2019. Previous research also indicates a sharp rise in the number of cross-border remote workers in Serbia, reaching thousands (Radonjić, 2022). Most of these jobs, around 95%, are offered by clients

[187] As per report by Euronews news portal: https://www.euronews.rs/biznis/biznis-vesti/38360/sve-vise-posla-u-it-ali-i-sve-veci-manjak-strucnjaka-najtrazeniji-programeri-koji-imaju-iskustvo-od-dve-do-pet-godina/vest

[188] Interview conducted in February 2022. The interviewee is an HR expert and a CEO of one of the largest IT employment platforms in the region, having access to one of the most comprehensive databases on labour trends in the sector.

[189] Data obtained by author from platform ´Helloworld´ in 2023

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located in North America and Europe, primarily the US, the UK and Sweden. However, as explained in the next chapter, the demand for such workers also dropped sharply in the aftermath of the hiring boom after 2023.

COVID-19 lockdowns were a catalyst for organisational transformation across companies, leading to the adoption of remote work models. This meant not only that remote work in the software development sector became possible, but also that there was a growing demand for the digitalisation of work processes, which in turn required an ever-larger number of software developers. As work shifted online, companies began looking beyond borders for access to larger, cheaper pools of software developers.[190] Conversely, Serbia became one of the prime locations for such outsourcing due to factors already outlined throughout the thesis.[191]

This surge in demand from companies inside and outside the Serbian labour market led to a battle for IT workers. According to one scholar researching the regulation of the Serbian IT sector[192],

> We have a situation in which Serbian companies fight for the labour force on several fronts. Firstly, they have to compete against markets in developed countries, as software developers are leaving the country. Secondly, due to modern technology, foreign employers can enter the Serbian labour market without even opening a company here, meaning they can get a job from abroad without leaving the country. Thirdly, they have to compete with hundreds of companies in the local market.

This context of high labour demand has led to an increase in salaries and improvements in work conditions to attract workers, particularly senior ones. In the interviews I conducted, employee poaching was described as particularly prominent in Serbia. Ultimately, it was profitable for companies to keep increasing their labour force and capture even more value from outsourcing. Furthermore, for some companies, more employees meant a higher value on the financial

[190] As per article by Fortune magazine: https://fortune.com/2023/04/13/remote-work-outsourcing-white-collar-jobs/
[191] E.g. per Joberty, one of the largest IT employment plaforms in the region: https://www.joberty.com/blog/best-countries-in-europe-to-hire-remote-developers/
[192] Interview conducted in October 2021. The interviewee is a legal expert and academic, one of the key experts involved in IT sector regulations taking place in that period

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markets before they sell. This translated into a general hiring frenzy, lowering entry barriers in the sector and increasing the state's efforts to ramp up IT education and produce more workers for the sector, as described in the following section.

The software frontier and the production of labour

In the early days of outsourcing, only a small stratum of engineering graduates or exceptionally talented amateur developers were able to find work developing software. With time, due to an increasing demand and competition for labour, the sector became open to almost anyone who could code, as described previously. Oskar[193], the owner of the company Ribar, whose story was described in the previous chapter, explains this phenomenon through declining education demands when hiring:

> First, we accepted only FTN (Faculty of Technical Sciences) graduates because they were the best. When they became hard to get, we also took in PMF graduates [Natural Sciences and Mathematics Faculty], as they had decent mathematical knowledge and some programming skills. After that, we began taking people from different courses and self-taught developers because the demand was so big.

Entry barriers in the IT sector have become much lower than in other industries with strict educational background requirements. In the rising, relatively low-skilled outsourcing sector, it was mainly sufficient for workers to understand the basic programming logic and know how to code or even just test software manually. This led companies to seek a workforce outside of a small pool of engineering graduates, resulting in the inclusion of self-taught workers, career changers, and students. Due to the constantly rising demand, companies began hiring students halfway through their studies, self-taught individuals, and those from pre-qualification courses without a tech education background (Matijević & Šolaja, 2020). However, formal education still remained crucial in this process. While most companies did not require university degrees, the majority of software developers in Serbia did enrol in universities, where they gained basic

[193] Interview conducted in September 2024

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math and coding skills. Companies like Zvezda are particularly important as they enable students without prior experience to develop skills and enter the labour market, potentially leading to extensive career opportunities. Such opportunities meant that those who could learn to code sufficiently well could mostly get into the sector in this period.

A clear example of an outsourcing company providing such opportunities is Dragan[194], a software tester at Zvezda. Dragan could not attend university due to financial constraints, and he worked as a waiter for several years before deciding to switch jobs to pursue a more promising career. He completed a few Udemy courses online on manual and automated software testing, and he also took a two-month course at a private educational centre to earn a certificate. He was applying for jobs all around Serbia and getting rejected several times. After a few months, he got an interview at Zvezda and passed it. Although starting on a low salary by sector standards, he rose through the ranks and developed a career at the company. In his words:

> Zvezda definitely gives a chance to less experienced people. I got a chance with zero education and work experience in IT. And in just two years, I was offered the team lead role. My salary is significantly above average in Serbia, and I only keep advancing.

Srdjan[195], a former worker of Zvezda, who studied software development, shares a similar experience. While holding negative feelings towards the company, he says:

> Honestly, putting aside everything, it was a springboard for my career. I learned a lot of technical skills as I worked on various projects, and I understood how clients think about what they need and how to deliver it…I would never have the job I have now if I didn't properly sweat in outsourcing.

However, it is not only this wide admission in the sectors that led to the proliferation of the workforce and growing social mobility. The state also enabled it, mainly through the expansion of the IT education programmes. For a long time, the state was a passive actor, mostly maintaining inherited systems of public education and research institutions that trained

[194] Interview conducted in August 2023
[195] Interview conducted in August 2023

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engineers. However, over time, as the sector experienced exceptional growth and opportunities for profit, it led to the formation of industry lobby groups. Primarily, industrial IT initiatives, such as Digital Serbia and the Vojvodina ICT Cluster, consistently argued for expanding educational capacities due to a shortage of software engineers in the market.

Responding to these demands, the state began increasing the number of educational institutions offering programs in software development and related profiles. Already in 2020, 20% of all students in Serbia were enrolled in ICT-related fields (Matijević & Šolaja, 2022). As of 2022, Serbia had 53 higher education institutions providing some kind of ICT education. While many of those are private, state universities and other educational institutions significantly expanded their educational capacities. This was a result of state policies that increased enrolment quotas in IT departments at universities and introduced IT education in elementary schools (Ilahi et al., 2019). For example, children in 1st grade of elementary school already have the subject ´digital world,´ where they learn about digital technologies and an algorithmic way of thinking. Coding in Python is also mandatory in elementary schools, starting in fifth grade, as part of the informatics course.[196]

In general, state policies play a significant role in integrating regions into global production networks by providing human resources, primarily through education (Coe & Yeung, 2015; H. W. Yeung, 2009). For example, previous research on India shows that state education reforms were the main condition for the development of the local IT sector and its integration into global flows (Narayan, 2025).

However, as argued in the previous chapter, the state's role in the Serbian IT sector is rather reactive and less strategic, as most initiatives came from the private sector. Although private sector organisations and individual companies have been pushing the state to expand education

[196] "Vlada Srbije očekuje više od 1,4 milijarde evra od izvoza iz IT sektora," N1, February 14, 2020, https://rs.n1info.com/biznis/a569464-Vlada-Srbije-ocekuje-vise-od-14-milijarde-evra-od-izvoza-iz-IT-sektora/.

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programmes, they themselves, in some cases, participate in them. The entire course modules at different faculties of technical sciences are practically run by private companies that shape the curriculum for the profiles they need. For example, Schneider Electric in Novi Sad founded a module to create software development profiles in the field of energy grids. This way, the state played a role in absorbing costs and enabling value capture, but without a developed vision for broader development.

Furthermore, the role of formal education programmes should not be overestimated. As argued previously, many companies do not require degrees, and many enter the sector as self-taught workers. In addition to formal education programmes offered by the state, a myriad of bootcamps and informal education initiatives offered and still offer courses in software development, primarily front-end and back-end web development. These include programmes such as IT Akademija,[197] bootcamps offered by private companies such as Microsoft,[198] and a range of other initiatives.[199]

Leveraging the demand: The value capture trajectories of Serbian IT workers

While the previous section outlined the structural conditions that enabled the proliferation of software developers in Serbia and improvements in their working conditions, this perspective is not sufficient to understand value capture by labour. As outlined in the introductory section, numerous GPN critics have argued that labour should be conceptualised as an active agent reshaping production networks in line with its own goals and needs. Adopting this perspective enables a deeper understanding of how labour captures value from work in the Serbian IT

[197] https://www.it-akademija.com/
[198] https://www.microsoft.com/en-rs/mdcs/studentprograms
[199] E.g. https://itbootcamp.rs/ ; https://www.divac.com/Economic-Empowerment-and-Promoting-Employment/2571/IT-Bootcamp--nonprofit-IT-school-for-retraining.shtml ; https://www.bgit.rs/en/

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sector, moving beyond a purely structural interpretation focused on economic upgrading and inter-firm competition.

However, while critiques of GPN theory have predominantly focused on labour's collective strategies, the following analysis demonstrates that individual strategies played a significantly more prominent role in shaping labour's value capture dynamics in Serbia. Workers in Serbia have been primarily incentivised to pursue individual strategies, due to high market mobility, power and fragmentation in global production networks. While in this section, I outline individual worker strategies, the failures of collective organisation will be described in the next section.

Due to high market demand and the availability of various work options in the mature phase of the Serbian IT sector, individual workers held significant market mobility power. This includes not only their ability to move domestically from one place to another, but also to transcend local power geometries through remote work, thereby increasing their negotiating power of labour vis-à-vis capital (Coe & Jordhus-Lier, 2011; C. Smith, 2006). A concept of market power described by Wright (2000), designating workers' collective bargaining power owing to their indispensability in the market, is useful in this context. However, I focus on individual, rather than collective market power and individual strategies of utilising it, as this is the primary form of labour struggle in the sector.

The emphasis on individual improvement of market position and value capture is the prevalent motive in personal interviews with the workers. While some developers did express a preference for flexibility - an aspect I briefly address in this chapter - their primary motivation often centred on securing higher incomes, though to some extent on improving overall work conditions as well. This aligns with the concept of social upgrading scaled down to the individual level that I use to describe value capture by workers. Consequently, workers

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increasingly adopt firm-like behaviours, strategically leveraging market mechanisms to maximise their value capture. In doing so, they adapt to the sector's dynamics and navigate its temporary, contested value-capture opportunities.

While subcontracting firms and platforms seek to position themselves as brokers between clients and workers to capture value from mediation, workers are also using various strategies to escape such mechanisms and increase their share of income from outsourcing arrangements. In this broader struggle over the distribution of the outsourcing gains, workers, much like firms, strategically leverage uneven geographies to their advantage. By taking advantage of the competition between outsourcing companies, they jump between jobs to increase salaries, cut out intermediaries by working directly and remotely for clients abroad, or even become intermediary companies themselves. By doing this, workers are increasing their salaries and working conditions, but are also becoming rentiers – capturing value not just through salaries but also through rents. These different value-capture trajectories are the focus of the following sub-sections.

Job hopping and market mobility power

One of the main strategies used by workers to secure higher salaries is frequently changing companies, or what is known as job hopping, a common practice in the sector (Feuerstein, 2013; Nicole Mayer-Ahuja & Patrick Feuerstein, 2008; Upadhya, 2016). Job hopping is typical of software outsourcing locations such as India or Romania, where workers take advantage of continually growing sectors to leverage high labour demand and achieve higher wages and better opportunities for advancement (Mateescu, 2022; Mateescu et al., 2024; Upadhya, 2016). As a result, workers prioritise short-term gains over long-term commitment to their employers.

Due to workers' high individual market power, the threat of leaving the job translates to their market mobility power (James & Vira, 2012; Smith, 2006). Market mobility power refers to

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workers' ability to move between firms or to signal the threat of departure, thereby pressuring the employers to concede to better working conditions. The threat of workers leaving poses a significant challenge for companies, particularly in periods of increased labour demand, as high labour attrition disrupts project cycles, incurs substantial costs, and potentially results in the loss of clients (Nicole Mayer-Ahuja & Patrick Feuerstein, 2008). This was also confirmed in interviews with several managers. Sergej[200], a former lead software developer in a major game development company, explains: "That [switching companies frequently] is the reason why our apps crashed and bugged so often. Basically, someone writes code and leaves the company, then another person continues and adds their own code, and another…That is why companies want to keep people."

Labour turnover is exceptionally high in the Serbian IT sector relative to other sectors, with senior developers in particular having many opportunities to switch.[201] One study estimated that the workers change companies every three years on average, with a higher salary as the main incentive for switching (Matijević & Šolaja, 2020a, 2022).[202] According to another research study conducted among Serbian IT companies in 2023, the worker turnover rate in the sector was estimated at 22%, compared to 10% only 3 years prior.[203] This means that, on average, each year 22% of employees leave their companies, particularly in basic subcontracting companies, where workers have less attachment to the products and the company.[204]

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[200] Interview conducted in July 2023
[201] As per Joberty, one of the leading IT employment platforms in the region: "Da li su senior programeri u Srbiji razmaženi luksuzom koji diktira manjak konkurencije na tržištu?," Joberty Blog, May 11, 2021, https://blog.joberty.rs/zasto-je-skoro-nemoguce-zaposliti-senior-programera-u-srbiji/.
[202] Also per Bloomberg Adria news: https://rs.bloombergadria.com/biznis/kompanije/65605/it-industrija-u-srbiji-sta-se-krije-iza-velike-fluktuacije-zaposlenih/news

[203] As per Fenix HR research: https://www.netokracija.rs/fenix-it-istrazivanje-2023-207483
[204] As per Bloomberg Adria calculations: https://rs.bloombergadria.com/biznis/kompanije/65605/it-industrija-u-srbiji-sta-se-krije-iza-velike-fluktuacije-zaposlenih/news

Labour fluctuations are also a significant issue at Zvezda. As the labour turnover rate climbed above 20% at one point in time, according to the CEO's comments on an online forum, it was mostly due to workers leaving for better opportunities. In the words of the company CEO[205] in an interview:

> People leave companies for a 200-300 euros raise, so we have to catch up with local wages constantly. Although we try to have a good work atmosphere, we know most people will leave for a higher salary. Sometimes, it is not possible to prevent this.

Workers at Zvezda have also confirmed this. Veljko[206], like many other software developers, came to Zvezda in search of higher salaries:

> I left both the first and the second company because I couldn't get raises. When I was applying for Zvezda, I asked for a higher salary than I had previously received for the same position, and I got it. In general, if you stay in one place, it is very hard to get much higher salaries, as raises are incremental. It is possible to get raises, but honestly, switching companies is a much faster way to negotiate for more money.

Krstan[207], whose several team colleagues have left, further explains the logic behind switching companies:

> One solution we have left on this market is a so-called 'centrifuge'. That means constant rotation from company to company to get higher salaries. Every time you change companies, you get like 10 to 15% more. So, I am a junior in my company, and if someone with my skills and experience comes from another company, they will get more, so they can attract them. This is why my colleagues massively switch companies for higher salaries.

According to Sergej[208], a former team lead in a large gaming company:

> Most of my friends have changed five or more firms, and they are constantly circulating. They come in with the idea that they can secure better work conditions in the short run and then leave. So, the same way the company threatens them, by making them replaceable, they also treat the company like that.

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[205] Interview conducted in May 2022
[206] Interview conducted in August 2023
[207] Inerview conducted in August 2023
[208] Interview conducted in July 2023

Thus, ultimately, the workers act like the enterprises in the sector - maximising their short-term value capture prospects and optimising their position in the market, mimicking the opportunistic behaviour of companies.

Cross-border remote work and disintermediation from brokers

Switching companies enabled workers to gain concessions from employers in the Serbian labour market. However, cross-border remote work brought the value capture to a higher level, enabling workers to circumvent rent-seeking intermediaries, earn significantly more directly from foreign clients and improve working conditions. By working for clients abroad without mediation as individual workers, Serbian workers deny access to rents based on mediation to both platforms and subcontracting firms. I call this process disintermediation. As explained in the previous chapters, online labour platforms and subcontracting companies emerged as mediators, bringing supply and demand of labour and profiting from it. However, workers massively began to challenge this mediation and leverage uneven geographies to their advantage to capture more value from their work. Thus, as argued in the chapter on platforms, in some cases intermediaries or brokers served only as catalysts (Stovel & Shaw, 2012) that enabled workers to get connections only to later discard them. On the one hand, this was a consequence of brokers losing power in a mature market saturated with work opportunities. On the other hand, it was also a result of the established reputation of the outsourcing location, signalling competence to prospective employees. This sub-section will explain the process of disintermediation in more detail.

As outlined above, Serbian remote workers usually work for companies in high-income countries, often start-ups and other product companies, where labour compensation and working conditions are better than those available locally through intermediaries. Conceptually, this disintermediation can also be understood as individual social upgrading, or moving to higher-value-added activities within production networks by increasing proximity

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to labour buyers (Blažek, 2016; Kaplinsky & Morris, 2000). Thus, instead of collective upgrading of workers stemming from the company´s climb up production networks, workers are themselves moving through production networks to secure better working conditions. This includes higher pay, an improved work environment, and the opportunity to work on more complex tasks, rather than through intermediaries.

Many workers in Serbia I spoke with use platforms to find stable, long-term clients to work for outside of the platforms. This happens despite the platforms' creative attempts to block direct communication between workers and clients and to establish full control over the digital ecosystem, as described in Chapter 2. While platforms have introduced a range of mechanisms to forbid the sharing of private contacts, workers have found ways to locate clients online, bypassing contact-sharing blocks within the chat.

Software developers I interviewed are actively considering this form of work as a way to cut out intermediaries and capture more value from their own work. Particularly in the case of platforms, workers accepted exploitative work arrangements and used platforms as a jumpboard, to be circumvented and discarded in future. Pavle[209], an experienced software developer who worked on platforms for over a decade, explains his motivation in the following way:

> Upwork is just an intermediary to clients... I never wanted to do small jobs like 'fix me this and that on the website and move this button a bit to the left' for 10$. That is dirty work. I used the platform to get big clients and do serious work. […] The platform is just a first stage where I get to meet someone, and then we usually just start working one-on-one without paying the platform's fee.

Similarly, Milenko[210], a senior software developer working remotely for a US-based company, explains why platforms were used to get to the clients.

> Many of the people I knew started working remotely by finding clients through platforms like Upwork or Fiverr. That was the only way to meet some U.S. employers

[209] Interview conducted in February 2022
[210] Interview conducted in December 2021

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> back then, except maybe through our people abroad. How else? We were isolated from the world. […]. I was also hired by this U.S. company because some friends found clients on platforms and then connected with them directly.

Vladimir[211] also found his current American employer through Upwork. They had a mutual agreement to get off the platform and continue with remote work arrangements. One of the primary reasons for leaving the platform was to avoid the heavy digital rent the platforms were charging. In his words:

> I don't want to give them 20% of my money…After the platform takes a cut, Payoneer takes a cut, and the bank takes a cut, it turns out I just work for them. And my work on the platform was cheap in the first place.

In the same way that workers see platforms as middlemen, many also see outsourcing companies as unnecessary value-capturing agents. Aleksa[212]. explains this in the following way:

> So, what I do now is work directly for the client, without intermediaries. Until now, I have been working for a company that provides services to clients. I was doing the same job; it was just that the company employed me and paid me a smaller wage than I get now. So, the money still comes from the same source. But you are just the first and only one in Serbia to get paid. You are the added value. Outsourcing companies do not profit from you.

Sergej[213] also shares his sentiments about a game development company he worked for:

> When I worked for them, all the fruits of my labour ended up in France. When I work remotely on my own, it's the same, but I earn more, and I learn more now that I don't do outsourcing. I work directly for an American company, and I have meetings with the CEO every day.

This phenomenon illustrates the reasons behind the declining ability of intermediaries to capture rent based on interconnections driven by the proliferation of personal networks in outsourcing. While some previous literature indicates that labour intermediation leads to the growing squeeze of value from the workers (Barrientos, 2013), this is not the case in the Serbian IT sector. The main reason for this is that, compared to industries with low-skilled, immobile

[211] Interview conducted in March 2022
[212] Interview conducted in April 2022
[213] Interview conducted in July 2023

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labour and low global demand, the IT sector, in its expansion phase, was characterised by high worker demand and mobility. Consequently, many workers took advantage of that, kicking out the intermediaries and capturing more of the value they were paid for their work.

Most of my interviews confirm that higher pay is the main reason for this disintermediation. According to Joberty, a major software development employment website, the average annual salary of a remote software developer can be several times higher than the average local salary.[214] Although this salary comparison is certainly overstated due to the predominance of higher-paid senior developers among remote workers, it is still higher than the local senior salary. These differences are confirmed by interviews: all the workers I spoke with received a significant salary upgrade in remote work, with many of them seeing their salaries double. Two remote workers, Sergej[215] and David[216], explain this phenomenon in separate interviews in the following way:

> People in Serbia switch companies for a 5% higher salary. Imagine what they see when they see remote ads for 200 or 300% higher salaries? It is a game changer […] My salary is huge. I work a more interesting job in game development, and the salary is 2.5 times higher than it used to be; it is a no-brainer for what I would choose. This wage increase literally changes your life: I can now support my family. This is a European salary. A friend of mine who works remotely for Americans has between 10 and 11 thousand per month. That is literally the yearly salary of a junior developer in Serbia.

Another hallmark of social upgrading in global production networks through remote work, in the case of Serbian software developers, is improved work conditions. As outlined in the second chapter, subcontracting companies profit from reselling labour, engaging in strict managerial control to extract more value from workers. In contrast, companies hiring remote workers, who usually develop their own products, have significantly better working conditions, as they do not work on a project basis and, in principle, achieve higher returns on labour. Therefore, this labour is not seen as expandable and replaceable as they engage in more core tasks (Feuerstein,

[214] https://www.joberty.com/blog/developer-salaries-eastern-europe/
[215] Interview conducted in July 2023
[216] Interview conducted in December 2021

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2013). Furthermore, working for companies in the core countries also usually entails adherence to their work norms. Employers in the U.S. and Europe with core remote teams are likely to treat them in line with local employment norms, unlike subcontractors in other countries.

Several workers I interviewed report significantly less managerial pressure when working remotely, in contrast to those in outsourcing companies. According to Vladimir[217]:

> We have deadlines, but it is not nearly as stressful as it was at the outsourcing company I worked for. We meet twice per week just to report on what we have done. And it obviously works. Of the 15 of us, at least 4 were guys who had burnouts from previous jobs and wanted some peace – of course we all worked in outsourcing previously. This is the first time I have worked in a company where I am not required to do something "today, for yesterday" and where I have to trample and push just to finish the projects we have.

Improved working conditions also reflect in higher work flexibility and fewer work hours. For example, Milan[218] has more time for his fulfilling side work:

> I just didn't want to work a million hours anymore. Since 2014, I have worked, and I mean seriously worked, full-time and in various companies. After that, I switched to this part-time remote job. I realised my hourly wage is enough that I can live comfortably and do things I am interested in.

Finally, the desire to upgrade is not only about pure value capture in terms of income or improved working conditions, but also about the nature of work. As indicated in the previous chapters, the work outsourced through local companies and online labour platforms is often standardised, modular and less complex. This meant that work that usually requires fewer skills and less direct client communication was outsourced to low-cost destinations through intermediaries. More complex and non-standard core tasks are usually done in-house, in core economies, while Serbian workers in outsourcing companies have access to such tasks only rarely. For those who are driven by more challenging and rewarding work, this is extremely

[217] Interview conducted in March 2022
[218] Interview conducted in March 2022

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important. Through remote work and upgrading, they were able to work on complex and interesting tasks without physically crossing borders.

Sergej[219] explains his motivations in the following way:

> It was not just the money. I just didn't want to do peripheral stuff. You see, in Serbia, we mostly handle non-core tasks that companies in the West don't want to do. This means mostly some support things, testing, etc...For example, we were working on this start menu for this very popular game, which otherwise sounds exciting, but we just made game menu options for a specific console that were never even released in the end….So I got tired of it and had an ambition to work on serious game development. In the new company, I am in the core team where we discuss the writing, I do the architecture, and I am constantly in the loop. It is a huge contrast with what I did in Serbia… And we, or a large majority of us, did not want to be in game development to do just that; we actually wanted to make games.

David[220], Sergej´s former colleague, further details the stark contrast in work complexity between his old game development job in Serbia and his new remote job:

> It was a horribly boring job. Most of the time, they gave me a game that was already made, and I needed to make it run on another platform. Slowly, you start realising that that is as far as it gets and that there are no serious advancement opportunities in this job. Everything we do is based on engines that already exist and are developed in France by core people who are really killing it. What we do in Belgrade is just take that engine and put a bunch of content in it. So, for this, you do not need many skills; a bunch of juniors in Serbia are already doing it. This also means that if one of us goes away, another one comes; it doesn't matter because the job is not very complicated. [...] So that was one of the main reasons I left. I do not regret it, as I now have way more responsibility and autonomy, and I work on high-level stuff...This is a dream job for me, I work on a very big RPG game, and we are actually developing an engine. This constant learning is what actually motivates me and why I even started coding.

While cross-border remote work did create more job opportunities for some, remote work by itself does not guarantee social upgrading. Some companies in Serbia offer exceptionally high salaries, good working conditions, and complex tasks, while some remote workers handle more menial tasks and are cut off from the core tasks and learning process of the core team. Thus, here I would rather talk about remote work as one way to upgrade or capture more value from work.

[219] Interview conduced in July 2023
[220] Interview conduced in August 2023

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From workers to brokers: Reintermediation and establishment of subcontracting firms

In addition to improving working conditions through switching companies and remote work, some Serbian software developers do not want to remain only workers. Instead, they use the platform and their outsourcing connections to find several clients to start their own outsourcing companies. Thus, they become suppliers of labour for clients, effectively replacing previous brokers and accruing rents from this mediation. Therefore, instead of eliminating the middlemen to capture more value, as explained in the previous section, the workers themselves become middlemen. I call this process 'reintermediation'. Such a phenomenon has already been explained in previous research, for example, in which some platform workers become entrepreneurs, delegating work to others based on their connections (Soriano, 2021). In the Serbian IT sector, this is a broader process tied not only to the platforms but also to the founding of numerous companies.

Many outsourcing companies in Serbia emerged this way, including Zvezda, which was analysed in detail in Chapter 2. The company's owners initially used platforms as individual workers to connect with clients in the West, learn more about the software development market, and develop sales skills. They also took jobs through other outsourcing companies. After a specific period, they disintermediated from these arrangements and started dealing directly with their previous clients. By securing a stable client base, they were able to hire more people and become labour brokers themselves. This is the origin story of many companies in Serbia. However, this phenomenon is not primarily tied to the expansion phase, but rather to the integration phase described earlier in the thesis.

Oskar[221], the founder of Ribar, described in the first chapter, elaborates on their journey from platform freelancing to an outsourcing company:

[221] Interview conducted in September 2024

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> Once we built a profile, we started getting offers, and we could no longer handle them. The offers mainly came from smaller companies and startups, predominantly based in the U.S. This was when we started bringing in new people who could take on these extra tasks and practically began operating as a company. While we had some freelance clients outside the platforms, most of the work still came through platforms. We had strong profiles on Rentacoder, Freelancer, Elance, and Upwork platforms, and at some point, we linked all those profiles to our company website. Many of our clients on the platforms linked us to other companies and entrepreneurs, and the ball started rolling. This is when we really started earning money —not through salaries, but through profit.

Filip[222], a 30-year-old developer, also started his entrepreneurial career on Upwork together with two of his former colleagues. He explains the process of transitioning to a company in detail:

> Three of us left the company. Initially, we worked on digital platforms as individuals, and then in several months we opened a company that is active to this day. We all went to different interviews and we offered our services as a company, not as individuals. In a sense, we would say we have a team that can provide them with solutions. The issue was that 90% of the clients wanted just one person for a short time to join their team on ongoing projects. And that was the problem for us: we wanted to develop a business, not sell a person. Still, we had to do it several times to raise some initial capital. We did not have enough reputation to advertise ourselves to big, serious clients who would outsource entire projects to us.

However, they eventually built a solid outsourcing company that remains active to this day. He further explains how they eventually found clients and how he benefited from running the company:

> Finding new people on the platform costs them time and nerves. So, they are thinking, 'This guy is alright, he can find more people for our projects in his country'. Good for me, good for them…Ultimately, we managed to develop the business sufficiently not to need platforms. We now have enough big clients, and new ones are coming through personal recommendations. […] I don't work for wages anymore, but I work for the full value of projects. Even after I pay the developers here in the company, and they are not cheap, I still make quite decent profits. This was a great decision, as I moved from heavy coding and irregular work to passive income, and I can live well off it.

These examples show how workers in Serbia build a reputation with clients, leading to an increasing volume of work, which enables them to delegate further. This enables them to become new brokers, capturing rents from the intermediation and their access to clients. This

[222] Interview conducted in March 2022

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is the ultimate form of value capture for workers – capturing profits and rents, instead of salaries.

Finally, some workers like Pavle[223] not only started their own outsourcing companies but also became partners in start-ups.

> On Upwork, I found some UK people with whom I clicked quickly. They were developing a startup in the early stages. I did initial work for them and figured out what they needed from the technical perspective. Then I told them, 'You know what, I don't want money for the next piece of work, I want a percentage from your startup. I want to become a partner.' He was a bit hesitant at first, but I explained to him how I could help them scale up, and we could earn this much money together. Then we conducted evaluations and reviewed the business plan. Eventually, he offered me a fair percentage. This is the fourth year that we have been developing a product, and the pay from there is a large part of my income now. […] I always approach clients like that, and I was also offered jobs that way several times.

Ultimately, by founding their own outsourcing companies, the workers not only improve their salaries and labour benefits but also become new mediators or company owners, earning profits or rents. This is how the boundary between workers and enterprises often blurs in the IT sector. Not only do workers mimic companies' strategies to position themselves and capture value in production networks, but they often become companies themselves, either as one-person enterprises or by starting subcontracting firms. These strategies illustrate workers' active role in value capture processes, and multiple trajectories through which workers can upgrade their conditions.

Back to the structure: the limits to individual market mobility

The chapter so far has described several ways in which workers actively renegotiate their positions in global production networks. This agency is shaped primarily by its structural position in the networks, as well as by the sheer extent of demand for software development skills. In other words, workers' positions depend on their embeddedness in broader economic and political structures (Coe & Jordhus-Lier, 2011). Thus, while the global market did open up

[223] Interview conducted in February 2022

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for workers to exercise their mobility, such mobility happens within certain constraints. Job hopping was particularly frequent in the mature phase of the sector, while reintermediation and the launch of subcontracting companies were also possible in the integration phase. Thus, while workers might be shaping their positions in global production networks, they are not doing so under conditions of their own making.

Firstly, the workers' market power is shaped by the changes in labour demand. Most of the workers who successfully navigated the market and captured large shares of value entered the sector in its earlier stages and met the period of high labour demand as seniors. This gave them significant leverage in the growing market. While job-hopping is a common practice among junior programmers as well, senior programmers were the ones who took the most advantage of it. Furthermore, they were the ones who could secure remote work and capture value through disintermediation, as they already had the skills and autonomy clients needed. Finally, early platform workers could establish outsourcing companies when there were few competitors in the local and global markets. This reflects a general narrowing of rent-seeking opportunities for small outsourcing companies, as described in Chapter 3. It is similar to job hopping, which is, to a large extent, shaped by the structural market factors. During the expansion phase, due to rising demand and competition for labour, job hopping is very common, but during the contraction phase, employees want to stay with companies as long as possible to maintain stable employment.

Thus, high market power is, first and foremost, power only for more in-demand workers; it largely depends on the market dynamics. With the growth in demand for software developers in the mid-2010s, the value-capture opportunities for workers significantly expanded. Conversely, with the sector downturn starting in 2023 and fewer open positions, both locally and remotely, market mobility was significantly limited, as shown in the next chapter. As previous research shows, job-hopping frequency followed market fluctuations. Therefore, it

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increased during the expansion that happened during the COVID-19 lockdowns, while it decreased during the contraction period starting from 2023.[224] Similarly, the opening of outsourcing companies has become increasingly difficult due to growing market competition. The next chapter will illustrate the declining demand for workers in which their general market power is significantly weakened.

In addition to seniority and market trends, the workers' agency also depends on their position within production networks. Most workers are constrained by opportunities in the local market and can only partially participate in global production networks, depending on their ability to connect with employers at higher levels. Furthermore, these opportunities are also limited, as most of the clients they find through platforms or migrations are usually smaller companies and startups, not well-known Big Tech companies or famous unicorn startups. Furthermore, workers' attempts to disintermediate are constrained by intermediaries' actions. As explained in the previous chapter, digital platforms actively prevent workers from connecting with clients to avoid losing the intermediary role - their primary source of rent. The same practice is employed by outsourcing companies that contractually prevent workers from working directly for their clients for a specified period. Thus, while workers' mobility can be considered high, there are clear limitations to their mobility in the market.

The failures of collective labour struggles and opting for individual market mobility

As argued in the introductory section, collective labour struggles are seen in the literature as the main way workers attempt to capture a larger share of the value they produce. Yet in Serbia's IT sector, a collective labour organisation is absent primarily and, when tried, unsuccessful. While one attempt at unionisation failed completely, a few mobilisations that emerged were

[224] https://rs.bloombergadria.com/biznis/kompanije/65605/it-industrija-u-srbiji-sta-se-krije-iza-velike-fluktuacije-zaposlenih/news

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mainly protests against taxation targeting freelancers. These mobilisations were short-lived and failed to achieve lasting structural change. In this section, I will briefly describe these labour organisations and explain the key reasons leading to their failures. The main argument I am making in this section is that the lack of and failure of collective struggles largely stem from the high bargaining power of workers in the expansion phase of the sector's development, as well as the particular fragmentation of workers typical of the outsourcing of services.

Other factors also played a role in preventing collective struggles, mostly related to high individualism and a general distrust of collective struggles. However, these explanations significantly expand the scope of the argument and would require an elaborate historical analysis. Furthermore, such phenomena are unique to the sector and to the working class in Serbia in general (Lazić, 2011). Because of that, I primarily aim to explain the sector's unique structural features that facilitate such individualism and preference for individual value capture strategies.

On top of the high market power already described, these features mostly include the fragmentation of workers in the outsourcing networks (Flecker & Schönauer, 2016; Upadhya, 2016). In subcontracting, the projects come from elsewhere, and their actual management, in the case of staff augmentation, lies with companies abroad. For this reason, workers are less incentivised to struggle against direct employers. In both platform and non-platform freelancing, labour is even more fragmented, as employers are located abroad while workers are completely separated from each other(Coe & Jordhus-Lier, 2011).

The only significant attempt to unionise IT workers in Serbia took place in 2020, initiated not from within the workforce but by the international federation UNI Global Union.[225] Initially focused on telecommunications, the organisation sought to expand into the broader ICT sector,

[225] https://uniglobalunion.org/

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recruiting a small local team to reach out to software developers. This top-down approach was largely unsuccessful, as per the conversation with the organisers. Although the organisers identified genuine grievances among workers, such as stagnant salaries relative to company profits, opaque promotion systems, and widespread underappreciation, they were unable to attract or retain members.

Avram[226], the main organiser, described a combination of indifference and suspicion among workers. Many developers acknowledged their frustrations but regarded union membership as irrelevant to their individual advancement. He explains that workers know companies benefit disproportionately from their work, yet they still think they can negotiate better pay or move elsewhere. The hyper-individualised ethos of the sector proved a formidable barrier: most saw themselves not as employees with shared conditions, but as mobile professionals able to find a new job at will. A senior developer who supported the effort put it in the following way:

> The main problem with organising software developers is that they are hyper individualistic, think short term, and believe they can do the same job somewhere else for more money. That is the first impulse, and they have no desire to work long-term or create something in companies, just to come and go.

He further describes how company structures reinforce this logic. Short project cycles, rapid turnover, and the fragmentation of teams across firms and clients prevented the emergence of shared experiences. Pay secrecy clauses, sometimes contractual, but often just a company cultural norm, further undermined transparency, making wage comparisons and collective demands difficult. The result was the ultimate fragmentation of workers and a focus on individual advancement. As Avram put it:

> They are aware that, for now, their skills are on demand on the market and that makes them think it will always be like that…While saying they will talk with us, they simultaneously talked with management, trying to get some benefits. And once they get something, that is it, they are not interested in us anymore.

[226] Interview conducted in July 2023

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This way, the market opportunities, flexibility, and autonomy create a professional self-image of developers as value-capturing entrepreneurs of their own labour, rather than collective workers.

While attempts to unionise against companies faltered, mobilisation did occur when the state engaged in taxation efforts. In 2019, new regulations aimed at curbing tax avoidance among self-employed professionals, widely used by IT contractors and remote workers, sparked mass discontent. Thousands of freelancers and contractors had long relied on a flat-rate taxation model originally designed for small trades, paying modest fixed sums rather than income-based taxes. The reform required individuals to undergo an "independence test" to prove that they were not de facto employees of a single client, threatening to disrupt this arrangement.[227]

The response was the spontaneous formation of the Digital Community (Digitalna zajednica), a loosely structured network hosted on Slack and social media platforms. At its peak, it gathered several thousand members who coordinated discussions, drafted statements, and attempted to influence public opinion. They positioned themselves as defenders of entrepreneurship and innovation, arguing that the new regulation would "destroy the environment that allows Serbia's IT to thrive" and drive skilled workers abroad.[228] However, the protest movement was short-lived, and the Digital Community secured only minor concessions and temporary leniency during the transition period before dissipating.

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[227] As per legal interpretation by IT organisation Startit: https://startit.rs/objavljen-test-samostalnosti-po-kojim-kriterijumima-ce-se-utvrdivati-da-li-preduzetnik-nezavisan/

[228] E.g. "Kome Smetaju (Ne)Samostalni Preduzetnici?," *Digitalna Zajednica* (blog), March 5, 2020, https://www.digitalnazajednica.org/2020/03/05/kome-smetaju-nesamostalni-preduzetnici/; "Novi Zakon o Oporezivanju Mogao Bi Da Dovede Do Egzodusa IT-Jevaca Iz Srbije," *Digitalna Zajednica* (blog), November 26, 2019, https://www.digitalnazajednica.org/2019/11/26/novi-zakon-o-oporezivanju-mogao-bi-da-dovede-do-egzodusa-it-jevaca-iz-srbije/; "Otvoreno Pismo DZ Povodom Poreskih Izmena," *Digitalna Zajednica* (blog), October 28, 2019, https://www.digitalnazajednica.org/2019/10/28/otvoreno-pismo-dz-povodom-poreskih-izmena/; "Godina u Kojoj Smo Uništili Srpski IT," *Digitalna Zajednica* (blog), January 17, 2020, https://www.digitalnazajednica.org/2020/01/17/godina-u-kojoj-smo-unistili-srpski-it/.

I conducted brief digital ethnographic research within this group, interviewing key members and noting the discussions. Based on these insights, the key issue with the organisation was primarily fragmentation and internal differences that surfaced. Members ranged from high-earning contractors working for Silicon Valley firms to modest freelancers providing basic services. Their income levels, tax statuses, and political orientations differed substantially, leading to endless debates over tactics and objectives. One organiser, Milenko[229], recalls that:

> The founders of the group were saying that while the taxation had passed, we should make a solid organisation that can deal with future issues. However, the majority only cared about not paying the money in the short term and just gathered around this single thing.

Thus, coordination of such efforts proved impossible due to large differences among members, a lack of common goals, and a short-term orientation toward individual and temporary value capture. Of course, apart from these factors, the existence of individual exit strategies due to high market power was exceptionally important, as was the lack of external support. Precisely because of the privileged status of IT workers, there was no broader solidarity basis, particularly given that the regulation sought to remove their preferential tax treatment.

A second, more sustained mobilisation erupted in 2020 when the government announced plans to collect past unpaid taxes and social contributions from individuals earning income from abroad, together with interest rates. For many freelancers, the sums demanded were devastating, amounting to as much as 80% of their cumulative income. In response, thousands of freelancers organised under the banner of the Association of Internet Workers (Udruženje radnika na internetu). As with Digitalna Zajednica, I also conducted a digital ethnography with this movement and interviewed the main organisers.

Unlike the Digital Community, which gathered only IT workers and entrepreneurs, this movement included a broad spectrum of online workers: software developers, designers,

[229] Interview conducted in December 2021

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translators, teachers, many of them were platform workers. The association quickly built an online presence, organised mass demonstrations in Belgrade, and engaged in negotiations with the Ministry of Finance.[230] While the group's slogan - *Svi kao jedan* ("All as one") - projected unity, the reality was far more complex.

Income disparities between freelancers were stark. Senior developers earning several thousand euros per month materially shared little in common with English teachers making a few hundred. For some, the tax burden represented a threat to survival, while for others it was an unwelcome inconvenience. Because of that, the movement geared its rhetoric towards the lowest common denominator: protecting ordinary people from state predation and preventing the exodus of young talent abroad. This populist tone gained public sympathy but alienated high earners who preferred quiet negotiation or legal loopholes.

After months of protests, the association won partial concessions: debts were forgiven for low-income earners, and a new progressive tax system was introduced. Yet the outcome divided participants. Many higher earners, mostly software developers, rejected the settlement, while lower earners claimed victory. The association lost momentum soon after, with most participants returning to individual solutions, registering one-person companies, relocating abroad, or adjusting their tax arrangements. This again reflects how both fragmentation and workers' high market power in the IT sector prevent sustained efforts towards collective organisations.

Across these cases, collective action among Serbia's IT workforce remained episodic and fragile. While the unionisation failed completely, the Digital Community and the Association of Internet Workers were reactive, single-issue mobilisations that disbanded once immediate

[230]Slobodan Golusin (May 2021) Gig Work in CEE's Platform Economy: the Protests of Serbian Freelancers and the Possibilities of Digital Labor Struggles. Lefteast. Available at https://lefteast.org/gig-work-protests-of-serbian-freelancers/

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threats subsided. What is common to all these attempts is failure due to fragmentation and heterogeneity, and a resort to individual value-capture strategies. All of these attempts occurred during what I refer to as the sector's expansion phase, when workers had high individual market power. This power, derived from global demand, enables them to change jobs, work remotely for foreign clients, or exit the domestic market altogether. Such power translated into individual rather than collective agency.

What is also common for these three episodes is some willingness to confront the state, but the lack of protest against the employers. This reflects the structural geography of the sector: within globally dispersed production networks, the state is the only fixed and visible authority capable of enforcement, while capital and clients remain geographically distant and institutionally opaque. Firms are also seen as providers of economic opportunities, while the state is mostly perceived negatively, as a tax-grabbing disruptor. Thus, while the antagonism between workers and employers is directed towards the state, as shown previously, both sides have benefited from low taxation and flexible employment, capturing value at the expense of state revenues. When the state attempted to reclaim those revenues, the conflict was displaced onto the axis of labour versus the state. This is indicative of the broader logic of conflicts in the globalised economy.

Market power and individual struggles of Serbian IT workers

This chapter explored the value capture by IT workers. It set out to explore why there was such a large proliferation of high-paying jobs and large-scale social mobility. I have shown how both the structural conditions of the market in the growth and mature phases of the sector enabled such opportunities for workers, and also how workers actively maximised their value capture by individually navigating the market. These workers are not resisting exploitation, but rather renegotiating the conditions under which labour and the share of value they receive from their

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work. Thus, this social upgrading is a consequence of both structural factors, such as economic upgrading and competition for labour between companies, as well as active struggles to maximise value capture by workers. Due to high market power and high fragmentation of workers in software production networks, such struggles were largely individual, rather than collective.

On the one hand, the opportunities for workers came from the upgrading of the sector and the move towards high-value functions, but also through the increased global demand for IT labour, as well as competition for workers on the local market. Thus, in addition to the pure translation of economic into social upgrading, I show how this struggle for labour between firms is crucial. On the other hand, I show how workers actively attempt to capture more value from their work through job hopping, disintermediation and reintermediation. Through this, I show that workers are not only passive sources of value in outsourcing but also actively reshaping production networks through their active market navigation.

Still, this ability of workers to increase their value capture stems from their structural position in production networks and the specifics of integration and expansion phases of the sector. The ability of workers to negotiate high salaries and to disintermediate from platforms and subcontracts was ultimately contingent upon the particular historical moment of high labour demand in the expansion phase. The absence of collective organisation is also largely contingent on market conditions that enable workers to improve their working conditions solely through market mobility. However, it was also contingent upon broader fragmentation in global production networks, large inequalities among workers, and an individualistic focus. These are also the key reasons why some mobilisations against the state taxation were possible, while struggles against the companies never materialised.

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But what happens when the key condition for the emergence of this privileged labour strata dries up? What happens when the demand for labour falls? As shown in this chapter, the value-capture opportunities for workers depend primarily on their market power, while there are no labour organisations to protect them when this market power is lost. The next chapter will introduce the final, contraction phase of the sector in which these processes start to materialise. I will show that the large labour benefits were possible in a particular historical moment in the sector, but that this process is unstable and can easily change with shifts in capital accumulation cycles.

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CHAPTER 6: AFTER THE BOOM: CRISIS OF OUTSOURCING AND THE SHRINKING WINDOW OF OPPORTUNITY

So far, the thesis has explored the dynamics of value capture in the integration and expansion phases of outsourcing. Both phases developed in conditions of high demand for software developers. In the first phase, such conditions enabled labour intermediaries to source cheap labour and capture rents based on this mediation, while in the second case, characterised by maturation of the sector and rising labour costs, it enabled labour to enter the sector with low barriers and earn high wages.

In contrast, this chapter introduces a new setting - the declining competitiveness of Serbian companies, combined with a decline in global labour demand for software developers. The convergence of these two processes led to difficulties for companies in obtaining projects and maintaining profitability. This also made local companies and workers more replaceable due to the high mobility of capital in this sector, constantly seeking to optimise costs. As a consequence, the old outsourcing model is becoming less sustainable for companies, in line with capitalist dynamics of constantly eroding rents due to competitive pressures, and for workers, who are facing lower market power. This is what I call the contraction phase of the sector.

This contraction is not absolute, as the value of the sector continued growing in this period,[231] mainly due to exports by large multinational companies,[232] while the number of workers

[231] As per figures reported by Forbes: https://forbes.n1info.rs/vesti/izvoz-ikt-sektora-dostigao-296-milijardi-evra/
[232] Including Russian companies relocating to Serbia after war in Ukraine in 2022. More information at Bloomberg Adria: https://rs.bloombergadria.com/tehnologija/inovacije/81766/srpski-it-sektor-jaca-dolaskom-ruskih-kompanija-yandex-anygo-i-nova-era-saradnje/news

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remained stagnant.[233] What the contraction does is to capture the value capture opportunities for local companies and workers. Importantly, this contraction was not equal for everyone. While larger companies and those with greater market power largely recovered from the initial contraction, smaller outsourcing firms took a heavy blow, diminishing their profitability with many of them closing down. Likewise, Serbian workers are also bearing the brunt of the crisis differentially. While those in senior positions feel the crisis less, junior workers and new entrants in the sector are the most affected. Once most prospective employers were closing the door to new graduates. Thus, alongside rapid inclusion into global production, software development networks are also characterised by the potential for swift exclusion, depending on changing economic dynamics. This constant threat of losing competitiveness and falling out of market is mostly affecting the companies and workers with the lowest market power.

These dynamics are the focus of this last chapter of the thesis. The main goal of this chapter is to show that, in contrast to mainstream GPN scholarship, which focuses on inclusion in GPN and development, the exclusionary competitive dynamic perspective is equally important for understanding value capture dynamics – leading to brader restructuring and repositioning in the sector.. In this chapter, I am rounding up the story of the development phases of the sector, showing how the contraction also shapes the value capture prospect for both firms and workers. For this, I am relying on the disarticulation perspective in global production networks as well as uneven development literature. Importantly, these developments are pretty recent, and it is uncertain how this phase will develop in the future. Consequently, this chapter will not present extensive empirical analysis but rather conceptualise the changing patterns of value capture during sectoral contraction. On top of this, I am emphasising the specificities of such disarticulation dynamics in a semi-peripheral context.

[233] As per Euronews: https://www.euronews.rs/biznis/biznis-vesti/159163/nastavlja-se-pad-oglasa-za-posao-u-it-sektoru-u-srbiji/vest

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After outlining the theoretical framework I am using, I will first explain the factors that lead to the unsustainability of the established outsourcing model in Serbia. In the second part of the chapter, I discuss the consequences of this disarticulation and how workers and companies deal with them.

Articulation, disarticulation, embeddedness and uneven development

Up to this point, the thesis has primarily focused on the growing incorporation of the Serbian IT sector into expanding global production networks. However, production networks are exceptionally dynamic, particularly in software development, and are characterised by both inclusion and exclusion dynamics. As Bair and Werner (2011) argue, the mainstream GPN literature has been characterised by an ´inclusionary bias´ - a theoretical and empirical emphasis on inclusion into GPN and on theorising how it leads to economic development or uneven value-capture opportunities. While this perspective makes valuable contributions to understanding uneven development, it does not fully capture its dynamics. Instead, the authors argue for considering the ´disarticulation´ perspective, which would also examine the constant threat of exclusion of places, firms, and people from networks and its implications (Bair & Werner, 2011, 2015; McGrath, 2018).

The main mechanism behind this articulation/disarticulation dynamics lies in the key cost/performance logic of the lead firms, with a striving towards an optimal relation between lower costs and higher performance (Coe & Yeung, 2015). When such a ratio is beneficial, new regions, firms, and labour are primarily included in the GPN or articulated. Other factors, such as financial markets' incentives, consumer markets, and risk reduction, are important drivers of GPN dynamics and are relevant but less salient in this sector. Conversely, regions, firms, and labour also become disarticulated when this ratio is sub-optimal - primarily when demand for software services shrinks or when other locations offer cheaper or more skilled labour. As

capital is exceptionally mobile in the software industry and extremely sensitive to booms and busts, this creates a constant interplay between inclusion and exclusion across shifting, uneven geographies (Bair & Werner, 2011, 2015; McGrath, 2018).

This is particularly the case with the locations with lower added value services, such as simple software development outsourcing, as it is easier to disengage from them (Werner, 2019). As previously argued, despite some upgrading, the Serbian IT sector remains heavily focused on outsourcing and the provision of lower-value-added generic services. In GPN terms, this means that the sector is weakly embedded in production networks. While embeddedness is a much broader concept, indicating intricate relationships between firms in the network and local social context, networks, and territories (Bair, 2008; H. W. Yeung, 2015; H. W. Yeung & Coe, 2015a), in this argument, the embeddedness is primarily relevant in terms of anchoring of production in particular places. This means that the more particular networks of lead firms are tied to local institutions and unique knowledge and suppliers, as well as to large fixed investments, the less likely they are to disarticulate, as their production processes are too entrenched (Hardy & Hollinshead, 2011, 2016a). When production networks are weakly embedded, as in most of the Serbian IT sector, lead firms have greater freedom to detach and are incentivised to engage in arbitrage and relocation to locations with a more favourable cost-benefit ratio.

This critical GPN perspective aligns with earlier critical economic geography insights on the mobility of capital (Harvey, 2018; Smith, 2008). Such approaches argue that, due to declining profits, capital constantly seeks to uproot itself from current locations and move to new, more profitable ones. This way, it engages in a series of ′spatial fixes′ necessary for its survival (Harvey 2018). As capital moves into new places, the costs of production increase there, while they decrease in places from which it disengages. Per Smith (2008), this is one of the main contradictory tendencies of capitalism. On the one hand, capital must be embedded in particular places for accumulation to take place. On the other hand, it must remain sufficiently mobile

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that it can rapidly disembed itself. The result of these processes is an unevenly developed landscape with an influx of capital and development in certain places and deindustrialisation and disinvestment in others. This can also be seen through the broader lens of valuation and devaluation dynamics within capitalism.

On top of these uneven development dynamics, it is also crucial to consider the semiperipherality of the Serbian IT sector. This includes both the middle-income trap that companies are facing and other social factors shaping their prospects. On top of competing with the lower-cost companies in the peripheries and companies with higher value functions in the core, there is a highly uneven dynamic among companies. Smaller companies with less advanced services face the highest risks during a crisis, while multinationals dominating local markets have significant leverage to overcome the crisis and consolidate their market positions.

How do Serbian companies and workers navigate these rapidly changing, uneven geographies? The lack of demand from lead firms translates into lower value-capture opportunities for most firms, simply because volumes of work are declining. Such companies, as explained in Chapter 4, are constantly forced to find new sources of rent and/or upgrade in global production networks. When it comes to workers, their main source of power to capture value in networks came from their preferential market position and the high demand for their skills, which enabled them to switch companies, find clients abroad, or start their own companies. However, as this power declines, workers' ability to capture value also collapses.

Ultimately, in this chapter, I make two key conceptual contributions - firstly, I focus on the disarticulation of production networks and how it shapes value capture dynamics and repositioning in the sector, in contrast to the dominant scholarship stream, and secondly, I examine how these processes play out in the semi-periphery.

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The perfect storm: crisis of the software development outsourcing model

In the previous two chapters, I have described the expansion phase, in which demand for software developers was high and labour prices were rising, enabling high-value capture opportunities for both workers and companies. However, rising labour costs also meant a decline in Serbia's competitiveness as an outsourcing location, which was compounded by the general decline in global demand for workers. These developments challenge the current outsourcing model in the Serbian IT sector and threaten additional value-capture opportunities for local firms.

The semi-periphery curse: declining competitiveness and rising labour prices

The market expansion was characterised by a significant increase in salaries, the main company expense, leading to a decline in profits. While competitiveness issues existed earlier due to rising labour costs (Živković et al., 2018), these pressures only intensified over time (Matijević & Šolaja, 2022).

This decline in competitiveness is illustrated by the 2025 survey by the Serbian IT Association, which found that the main challenge Serbian companies currently face is high labour costs, which they cannot keep up with amid growing global competition.[234] According to interviews with company owners, companies are losing competitiveness on two fronts. Firstly, their services are no longer drastically cheaper than those of the IT companies in clients' home countries in the capitalist core. Secondly, they are also becoming significantly more expensive than in other outsourcing locations in the peripheries. This middle-income trap position has already been analysed in Chapter 4. I will address these two points consecutively below.

[234]As per Bloomberg Adria repor: https://rs.bloombergadria.com/biznis/kompanije/72708/koliko-su-plate-u-srpskom-it-ju/news

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Industry representatives are concerned that Serbian companies are no longer cost-effective for Western clients compared to local competitors. This illustrates the problems with the semi-peripheral position of the sector. According to the president of the ´Serbian IT Association´, a major IT company organisation, while Serbia was an attractive market for foreign clients due to the price, "recently, due to labour price increases, we came to the level of many EU countries".[235]

An IT entrepreneur and investor from Serbia similarly remarks in the same report:

> As someone who runs an outsourcing company, I can say that our competitiveness drastically dropped compared to our client countries, compared to someone who sits in New York 10 blocks away. This means they are the ones who will likely get the job if the labour price is not too different. [236]

This experience is also shared by Oskar[237], the owner of the outsourcing company Ribar, whose journey has been described in the thesis. In recent years, his company struggled to get work precisely because of this. As per one of their potential clients: "I can get developers for this much money in Germany easily, why would I hire you?" The pressure on wages is also experienced by Zvezda. As the CEO of the company elaborates[238], "This is unsustainable. The net wages of experienced engineers in Serbia are now almost equal to the net wages of engineers in Germany or the Netherlands." These experiences indicate that the advantages of outsourcing to semi-peripheries are becoming less attractive as labour costs rise, endangering the previous outsourcing model.

This phenomenon of wage equalisation is not specific to IT outsourcing; it is part of the broader trend of global wage convergence over the last two decades (Milanovic, 2016). While salaries grew little in the core economies, they have grown significantly in the economic peripheries

[235] Ibid.
[236] Ibid.
[237] Interview conducted in September 2024
[238] Interview conducted in May 2022

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and semi-peripheries, particularly for those working in outsourcing. This is despite the privileges in terms of higher wages that workers in the core economies still capture (Milanovic, 2016).

Conversely, due to labour price increases, other outsourcing destinations are becoming significantly cheaper than Serbia. In addition to traditional low-cost outsourcing destinations such as India and the Philippines (Aneesh, 2006; Upadhya, 2016), new low-cost locations have emerged, including Sub-Saharan Africa (Anwar & Graham, 2022). Globally, the number of software developers working in the outsourcing industry has surged in recent years. These trends further created competitive pressures on Serbian outsourcing companies. According to an interview with the president of the Serbian IT Association, Serbian companies are competing with those from India, Africa, and Latin America, particularly for projects in the U.S.[239]

One IT manager, working for a multinational software company and currently moving the production from Serbia to cheaper locations, explains the prospects of outsourcing in Serbia in the following way:

> When decisions are made on such cuts, the management does not think about countries, but about prices and quality of labour in those countries. And Serbia is no longer the cheapest, as the salaries are the same as in Poland or Czechia, while labour is much cheaper in Latin America, for example. This is why investors slowly turn to such locations. [240]

This practically means that as local value capture increases through increased wages, there is a push back by capital to hire labour elsewhere, ensuring cost optimisation. As per interviews

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[239] As per Bloomberg Adria article: https://rs.bloombergadria.com/biznis/kompanije/72708/koliko-su-plate-u-srpskom-it-ju/news

[240] As per interview conducted by NIN newspaper: https://www.nin.rs/ekonomija/vesti/60861/novi-otkazi-i-u-it-sektoru-u-srbiji-nakon-naglog-pada-akcija-na-berzama

conducted by Euronews, multiple IT company owners they interviewed consider relocating production to other countries due to high labour costs in Serbia.[241]

A new, but still not widespread, phenomenon is Serbian companies seeking cheaper labour abroad. A few of the Serbian companies have started hiring workers in Eastern Europe (Ukraine and Belarus) and North Africa (Libya, Morocco, Egypt, Tunisia), and some have also opened branches in Sub-Saharan Africa. Some IT companies are also reported to be considering acquiring labour in lower-cost Balkan countries, especially through the ´Open Balkan initiative´, which would create open labour markets between Serbia, North Macedonia, Albania, Kosovo, Bosnia and Herzegovina, and Montenegro.[242]

This mobility of work out of Serbia aligns with the mobile nature of global production networks elaborated earlier in the section, as well as the semi-peripheral position of the Serbian economy. Companies and places are dynamically included and excluded from global production networks based on the comparative advantage they provide in the global market, and semi-peripheries are dynamically placed between core and peripheral economies. Thus, as labour costs rise, semi-peripheries like Serbia are losing competitiveness to both core and peripheral countries. However, some companies in Serbia are profiting from these processes, taking advantage of lower labour costs elsewhere.

A widespread view among experts in the sector is that the main competitive advantage in lower-level outsourcing ultimately lies in labour costs. According to the 2022 report on the state of the Serbian IT sector, the sector's "competitive edge has been lost" (Matijević & Šolaja, 2022). Likewise, the former president of Digital Serbia claims that the existing positions of pure outsourcing are not sustainable anymore, as Serbia is no longer a cheap outsourcing

[241] Euronews: https://www.euronews.rs/biznis/biznis-vesti/185652/it-sektor-u-srbiji-trpi-posledice-ukidanja-subvencija/vest
[242] As per Bloomberg Adria repor: https://rs.bloombergadria.com/biznis/kompanije/72708/koliko-su-plate-u-srpskom-it-ju/news

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destination,[243] while a renowned economist, Branko Milanović also comments on this phenomenon: "This outsourcing model will work only as long as Serbian developers are cheaper per hour than others…and this era is ending".[244]

The end of the boom: declining global labour demand

In addition to the processes described above, the current outsourcing model in Serbia is also threatened by fluctuations in global labour demand. Not only are Serbian companies less competitive, but there is also less work in general. The IT sector is particularly vulnerable to external economic shocks and to the fast-changing dynamics of the global software industry, given its focus on outsourcing. The latest shock occurred in the post-COVID-19 period, starting in late 2022, when global demand for developers sharply declined after the rapid expansion of the previous two years.

There were several causes of this shift. Firstly, interest rates in the U.S. and around the world increased, making borrowing expensive and directly translating into fewer investments in the sector that previously profited from low interest rates. This meant less venture capital for startups and, in general, fewer investments, and pressure to achieve profitability by cutting costs in a sector where labour is a key expense.[245] This has also reflected on the Serbian IT sector.[246]

Secondly, the overall economic crisis and loss of competitiveness have hit the final buyers of software hard, primarily non-tech companies in Europe and the U.S., and have also reduced software budgets. According to available sources and interviews with experts in the sector, this

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[243] "Postojeće pozicije su neodržive - Intervju – Nebojša Đurđević, direktor Inicijative »Digitalna Srbija« - Nedeljnik Vreme," January 23, 2019, https://www.vreme.com/mozaik/postojece-pozicije-su-neodrzive/.
[244] "Milanović: IT sektor u Srbiji će oslabiti, ako se ne promeni," *Radio Slobodna Evropa*, 11:47:27Z, sec. Zašto, https://www.slobodnaevropa.org/a/milanović-it-sektor-u-srbiji-će-oslabiti-ako-se-ne-promeni/29446759.html.
[245] As per Pragmatic Engineer caclualtion, one of the most influential IT blogs: https://blog.pragmaticengineer.com/software-engineer-jobs-five-year-low/
[246] As per Netokracija, a large regional IT portal: https://www.netokracija.rs/it-otkazi-2024-218114

is particularly true of the German automotive industry, which underwent a deep competitiveness crisis and has been one of the main buyers of software produced in Serbia. This translated into cost-cutting measures that affected software procurement.[247]

The third reason is over-hiring during the peak of the COVID-19 pandemic lockdowns, driven by expectations of constant exponential growth. Namely, as expectations of rapid digitalisation were mounting, zero interest rates enabled unprecedented investments in technology. Consequently, Big Tech, as well as start-ups and outsourcing companies, started hiring labour at a previously unseen rate. However, after the initial boom, companies began laying off large numbers of employees.[248]

Furthermore, the increased use of AI is threatening to further reduce global demand for software developers.[249] While there is no reliable evidence on the rate of developer replacement by AI, many companies are acting with this expectation in mind.[250] Thus, so far not a certainty, the AI factor could significantly change patterns of labour demand in the future. Conceptually, this does not necessarily mean reduced demand for software development, but rather the outsourcing of work to machines rather than humans to reduce labour costs (Baldwin, 2019). This is particularly true of simpler, more replaceable tasks, which are typical of lower-level outsourcing, such as those in sectors like the Serbian one.

Finally, the most recent development in 2025 that could further hit the outsourcing-oriented sector is the potential introduction of the HIRE ACT in the U.S. This is a proposed U.S. bill that aims to discourage companies from outsourcing jobs by imposing a 25% tax on the use of

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[247] ibid.
[248] As per Forbes report: https://www.forbes.com/consent/ketch/?toURL=https://www.forbes.com/councils/forbestechcouncil/2024/07/03/from-overhiring-to-overhauling-the-tech-industrys-talent-paradox/
[249] As per Time report: https://time.com/7312205/ai-jobs-stanford/
[250] As per Forbes: https://forbes.n1info.rs/biznis/presek-stanja-u-it-industriji-iz-ugla-jednog-juniora-mediora-i-seniora-zlatno-doba-je-proslo-niko-vise-nije-siguran/

outsourcing services and disallowing tax deductions for outsourcing service payments.[251] As a consequence, commentators in outsourcing dominated countries such as India and Serbia are sounding the alarm as it can significantly damage outsourcing dominated sectors. [252]

These factors converged (apart from the HIRE act, which is not yet in power), leading to a significant slowdown in global labour demand, including among Big Tech and start-ups and, consequently, outsourcing companies.[253] For example, according to Indeed's software developer job statistics, in January 2025, there was a 35% decrease in job vacancies compared to 2020 and an over 70% decrease compared to the mid-2022 peak. Similar trends were evident in other countries such as Germany, France, the UK and Australia,[254] key client countries of Serbian outsourcing companies. This resulted in the number of software development jobs stagnating and even shrinking in absolute terms in this period (see image below).

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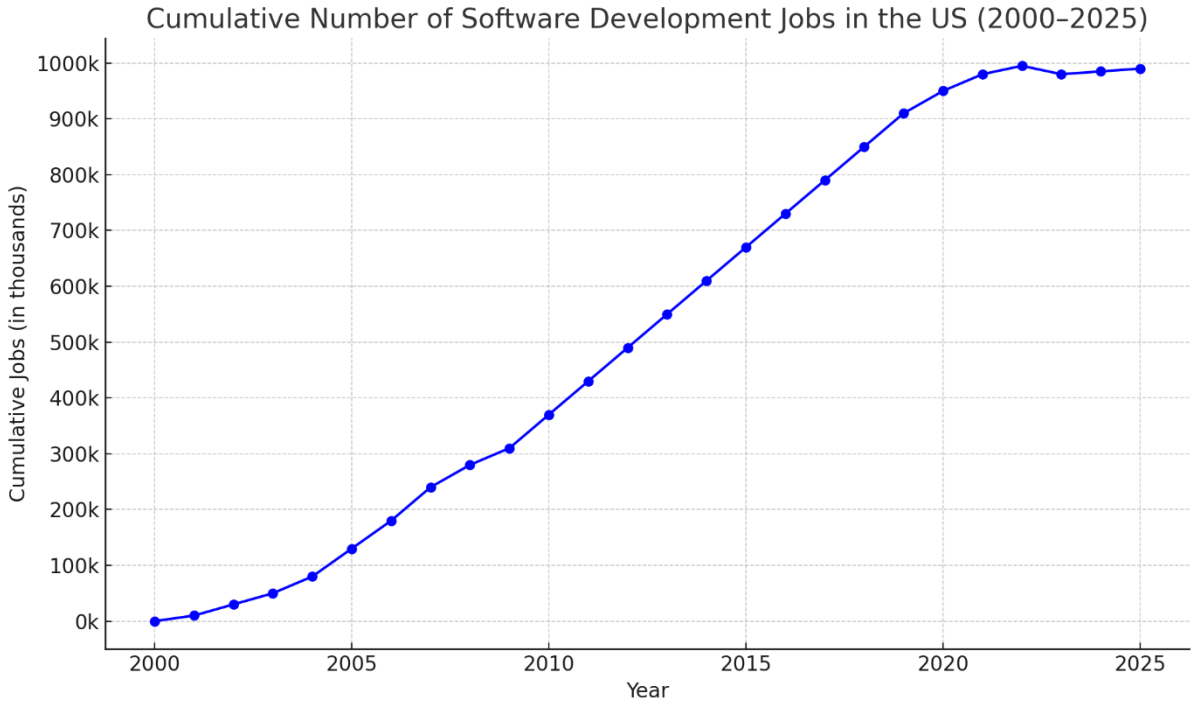
[251] As per Economic Times: https://economictimes.indiatimes.com/nri/work/hire-act-can-this-american-bill-topple-indias-it-industry/articleshow/123760014.cms?from=mdr
[252] India: https://www.newindianexpress.com/business/2025/Sep/12/hire-act-why-it-makes-outsourcing-less-attractive-for-us-companies; Serbia: https://www.netokracija.rs/hire-act-amerika-224526
[253] As per Pragmatic Engineer: https://newsletter.pragmaticengineer.com/p/zirp-software-engineers https://bif.rs/2023/07/dejan-djokic-asee-srbija-uprkos-otpustanjima-nastavlja-se-trend-rasta-domace-it-industrije/
[254] As per Pragmaic Engineer: https://blog.pragmaticengineer.com/software-engineer-jobs-five-year-low/

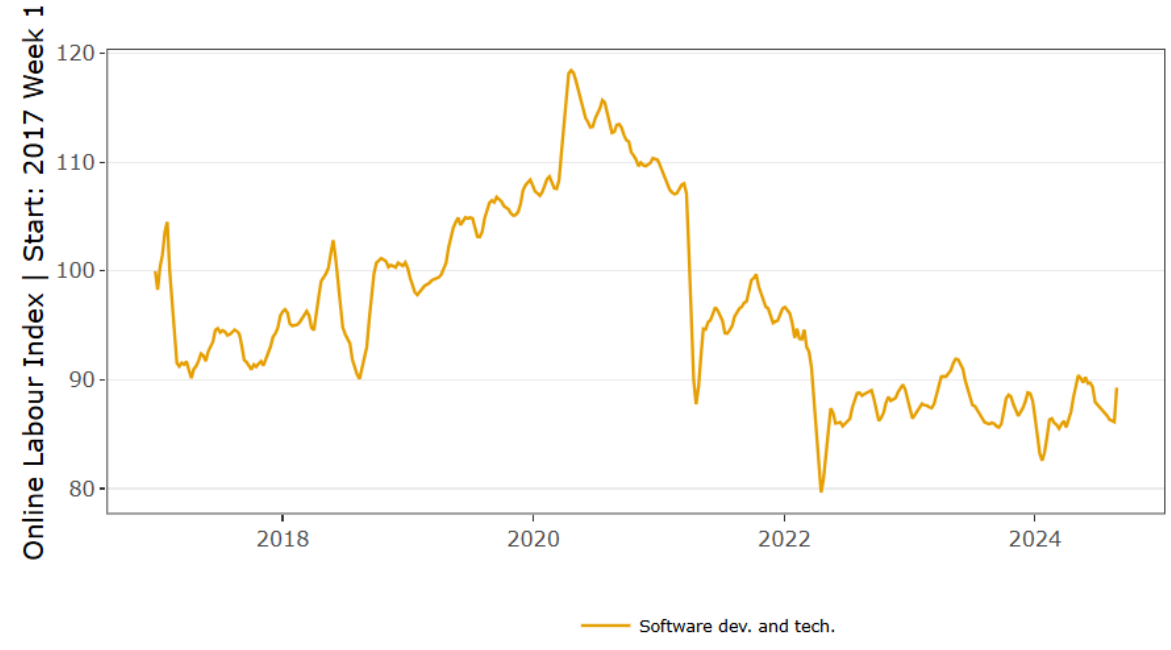
Figure 6. Cumulative number of software development jobs in the US (2000-2025)



Source: Live Data Technologies, downloaded through thepragmaticengineer.com in January 2025

This drop in demand can also be observed through the decline in hiring of software developers on online labour platforms, with the drop starting already in 2021 (see image below).

Figure 7 The global demand for software developers on major online platforms (2016-2025)



Source: OLI 2020 | onlinelabourobservatory.org

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Source: onlinelabourobservatory.org, downloaded in January 2025

These global developments also reflected on the Serbian IT sector. According to a 2025 survey by the Serbian IT Association, in addition to rising labour costs, firms are primarily struggling with fewer projects globally and increased competition.[255] The risks to labour demand also include high volatility when it comes to the political and economic events in the U.S., the biggest IT market, as well as in Europe, where most of their clients are based.[256] These developments led to a wave of layoffs in the Serbian IT sector, particularly among local outsourcing companies that are more replaceable and have fewer resources.[257] However, such layoffs were also prevalent in multinational companies.[258]

This crisis is highly visible in the software development job openings in Serbia. Already in 2023, there was a 52% drop in the number of IT job ads, compared to the previous year.[259] In 2024, there was a further 28% decrease compared to 2023, reflecting the continuation of this trend. This drop in demand was particularly stark for junior development positions. At the same time, the number of applicants remained high, with around 45,000 candidates applying for only around 7,000 positions.[260] Companies like Zvezda experienced a significant blow. According to the CEO´s reflections in his book, the low level of investment in software meant that clients bought fewer software services from them but also asked for higher quality at the same or lower price. While demand is lower and budgets are tighter, Serbian companies have to compete for workers whose salaries are rising despite global turbulence. This makes them exceptionally

[255] As per Bloomberg Adria: https://rs.bloombergadria.com/biznis/kompanije/72708/koliko-su-plate-u-srpskom-it-ju/news
[256] As per Bloomberg Adria: https://rs.bloombergadria.com/biznis/kompanije/76852/posle-2022-trump-opet-pali-crvene-lampice-u-it-ju/news

[257] As per Netokracija: https://www.netokracija.rs/it-otkazi-2024-218114
[258] As per NIN: https://www.nin.rs/ekonomija/vesti/60861/novi-otkazi-i-u-it-sektoru-u-srbiji-nakon-naglog-pada-akcija-na-berzama
[259] As per Helloworld employment portal data: https://www.helloworld.rs/blog/IT-trziste-Srbije-u-prvih-devet-meseci-Pad-potraznje-za-kandidatima-i-skok-konkurisanja/18575
[260] As per Helloworld employment portal data: https://www.helloworld.rs/blog/Ponuda-oglasa-za-IT-poslove-i-dalje-u-padu/20412

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replaceable on the global market. Other company owners I spoke with expressed similar concerns.

Ultimately, the convergence of rising labour costs and declining labour demand increases the risk of disarticulation in the Serbian IT sector and exclusion from networks. While the overall value of the sector and exports keeps growing,[261] as per interviews with experts, this value is concentrated in a few major companies, while these developments significantly impact most local firms and workers.

The new reality and the consequences of the crisis for firms and workers

The combination of declining labour demand and lower competitiveness has raised alarm in the sector, with a myriad of news articles predicting doom scenarios for the sector.[262] As the contraction phase is still unfolding and most of my fieldwork was conducted before its onset, the process and outcomes of the contraction remain quite unclear. Thus, this section will primarily examine the available evidence and its effects on local companies and workers. In particular, I will focus on the differential effects between companies and workers with different levels of market power. The main goal of this section is to illustrate the outcomes of disarticulation and capital withdrawal, contrasting them with previous phases and rounding out the thesis's insights into the cyclical nature of outsourcing and its effects on value-capture opportunities.

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[261] As per Euronews: https://www.euronews.rs/biznis/biznis-vesti/152009/srbija-prepoznata-kao-jedan-od-lidera-u-ikt-sektoru-rekordna-2024-za-srpski-ikt-sektor-5g-polovinom-godine/vest

[262] E.g.: https://www.netokracija.rs/it-otkazi-2024-218114 ; https://forbes.n1info.rs/biznis/presek-stanja-u-it-industriji-iz-ugla-jednog-juniora-mediora-i-seniora-zlatno-doba-je-proslo-niko-vise-nije-siguran/; https://www.euronews.rs/biznis/biznis-vesti/144631/izazovno-okruzenje-ili-kriza-u-it-sektoru-da-li-se-slika-sa-svetskog-nivoa-preliva-na-trziste-u-srbiji/vest; https://www.danas.rs/vesti/ekonomija/it-sektor-programeri-posao-kriza/

Survivors and losers of the sectoral downturn: companies´ trajectories in the contraction phase

What does this crisis mean for the prospects of value capture for local IT companies? Based on the available evidence, it can be observed that the value capture opportunities for most local companies have significantly shrunk. However, these effects played out drastically differently depending on company size and market power.

In a public interview, the CEO of Zvezda expressed concerns about the future of the IT sector globally due to current crisis, stemming from the convergence of structural shocks including economic crisis following Covid-19 pandemic, geopolitical disruptions and energy security. He stated: "Our industry won´t get out of a crisis for a very long time. We are going through a period the likes of which history probably hasn't recorded." He continues to explain how it already affected their business:

> We are currently feeling the effects of the crisis, and it's directly impacting our work in the sense that some of the projects we're involved in are getting cancelled…We lost several clients because of it this year. Some went into insolvency or bankruptcy, which means that a portion of the work we've already done will never be paid for

The effects of this crisis, however, varied across companies. Analysis of data from company balance sheets in the sector is provided below. As it can be from the first graph, the aggregate marginal productivity of small companies was consistently growing since 2010, being significantly higher than that of those of larger and medium-sized firms, presumably due to low costs of outsourcing on a smaller scale. However, their profitability plummeted in 2022, 2023 and particularly 2024, reducing several times compared to previous peak. Larger and medium firms follow a significantly different trajectory. They had a lower profitability overall with more oscillations through time, also with a significant drop in 2022 and 2023. However, their profitability shot up in 2024, leading to record high profitability levels.

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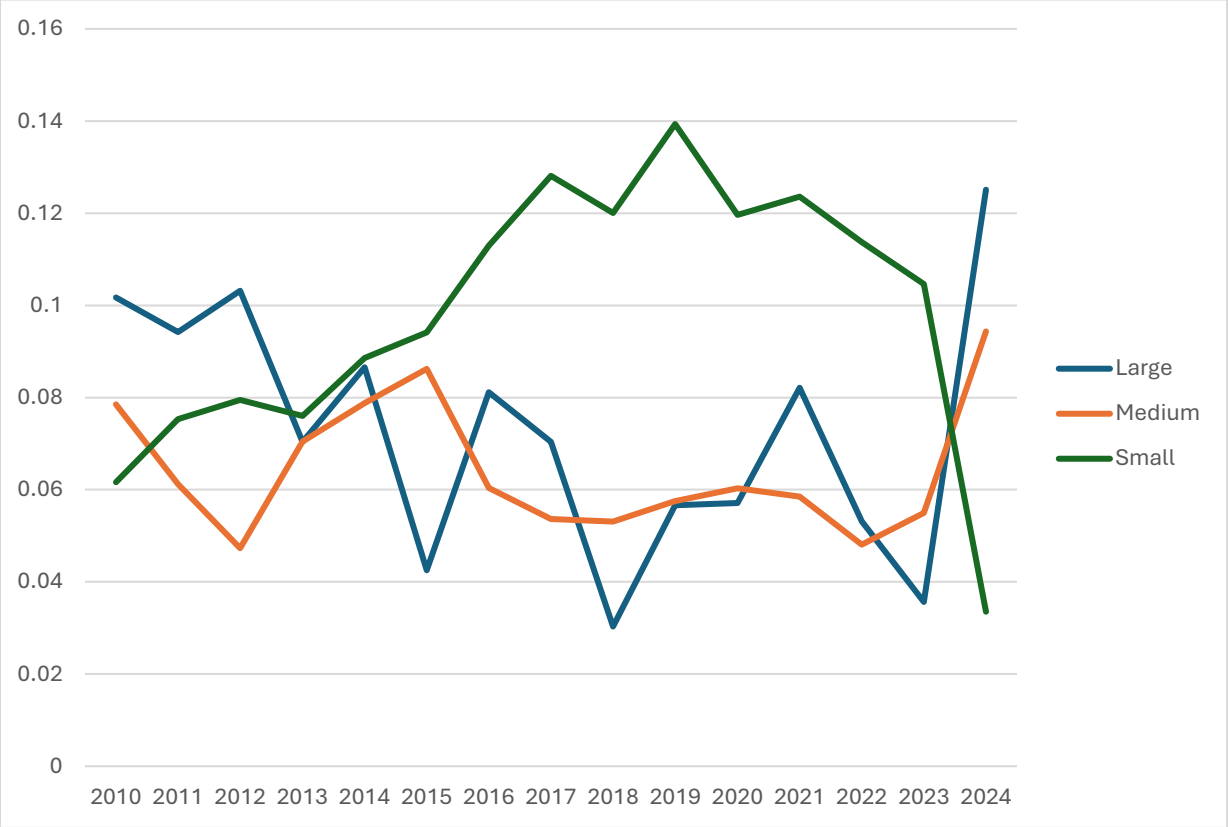
Figure 8 Aggregate marginal productivity of Serbian IT companies through time



Note: Analysis conducted by the author. Based on the quotient of total profits and incomes across companies

Based on data from 14 large, 62 medium and 47 small companies. 122 companies were selected according to descending company size. Companies were classified based on EU enterprise size classification (Small = <50 employees, Medium = 50-249, Large = >250), using 2021 employment figures as a reference point.

Source: APR – Enterprise Registry of the Republic of Serbia. Accessed in October 2025.

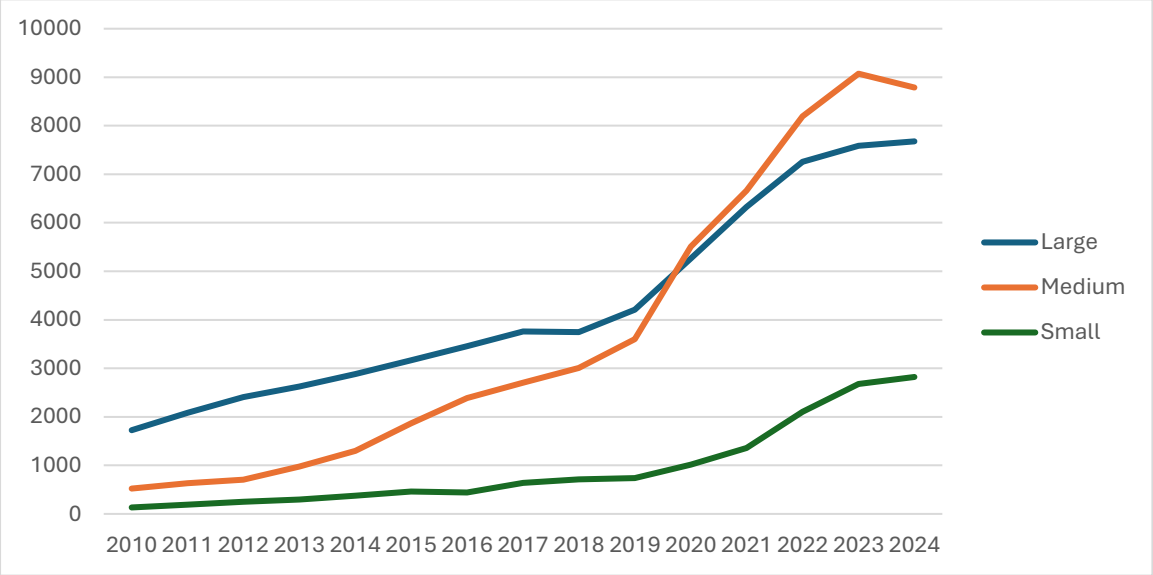
Qualitative evidence also supports these findings. Larger companies like Zvezda, or those with higher specialisation managed to push through by cutting costs. According to interviews with experts and a representative of an IT association[263], as of 2025, larger companies have mostly managed to weather the crisis through cost optimisation, including reductions in labour force and other expenses. A CEO of a large outsourcing company that conducted mass layoffs[264] also commented on the crisis in the interview with me:

[263] Interview conduced in January 2025
[264] Interview conducted in October 2024

> Everything started melting down in 2023. Less demand, less work, fewer open positions. Right now, the labour market has cooled down; there are way fewer openings, maybe 20-30%. Startups and smaller companies had to reduce staff; we also had to do it.

Publicly available data on major companies suggest that there has been reduction or stagnation in the labour force of large and medium firms and that it indeed overlaps with the surge in profitability in 2024.

Figure 9 Aggregate number of employees in major Serbian IT companies through time



Note: Analysis conducted by the author. Based on data from 14 large, 62 medium and 47 small companies.

Source: APR – Enterprise Registry of the Republic of Serbia. Accessed in October 2025.

However, smaller subcontracting companies focusing on staff augmentation have taken the biggest hit. In contrast to large companies, the cost-optimisation option was largely unavailable to smaller ones that mostly survive on a project-to-project basis. With fewer projects coming in, most did not secure enough work. Interviews indicate that many such smaller companies (up to 30-40% in some cities) closed down. However, I was not able to obtain quantitative data to confirm the number of closures. Start-ups were not immune to the crisis either, as in 2024,

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the number of active startups fell by 20%, ending the upward trajectory. This was mostly due to the scarcity of venture capital.[265]

The Serbian Gaming Association also published research indicating that the crisis disproportionately affected smaller local companies in the gaming subsector. While the overall revenues and employment of the largest companies grew, the employment among the top 10 Serbian-owned companies dropped by 12% in 2024. Furthermore, only half of the surveyed companies were profitable, while the others were operating at a loss.[266] According to the same report, out of 150 member companies in 2023, around a third of them closed down. 2024 also saw a record low of new position openings, around 130 in total. The main reason for the drop in recruiting is the need to reduce operational costs following the loss of client contracts, resulting in significant underperformance.[267]

Thus, smaller companies, oriented towards outsourcing, were hit by this contraction the hardest. Ribar, the small subcontracting company whose evolution this thesis has followed since the late 1980s, was also hit hard. According to publicly available company balance sheets, from 2022 to 2024, the company lost almost 40% of its labour force and saw its profits decrease by almost 90%. However, it ultimately did not operate at a loss. The CEO[268] of the company explains the problems:

> The crisis hit IT, and everything went to hell. It already started in 2022. The most important story here is about startups: as money was cheap, investors just wanted to pour in as much as possible, to pump money in. The only thing people cared about was growth as no one really thought about the usefulness of those products or their potential profitability. This was a bubble, and it was just a matter of time before it burst.
>
> […] A lot of our clients were startups. They ran out of money, either shut down or tried to optimise and adapt. That was the first wave. The next wave was mass layoffs from the tech giants. Investors got nervous and everything went on hold…Now everything's reversed - it's easy to find a developer, and hard to find a project. That's

[265] As per NIN report: https://www.nin.rs/ekonomija/vesti/75581/smanjuje-se-broj-domacih-startapa-ali-to-ne-mora-da-bude-lose
[266] As per Serbian Gaming Association data: https://sga.rs/godisnji-izvestaj/
[267] As per Serbian Gaming Association data: https://sga.rs/godisnji-izvestaj/
[268] Interview conducted in September 2024

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> the brutal reality: we don't have new projects. Software development has become a commodity, and now you have to lower prices to win clients. You have to find a way to survive…Looking back at the pre-crisis time, we were extremely spoiled and lucky to have worked during the hype. We managed to build a company and learn lessons during peacetime. Now it's wartime and we're fighting for survival.

Looking ahead, he sees no return to the past status quo: "The SaaS (software as a service) model is done. Things will be different from now on. The extinction process will take some time, but it will never go back to the way it was." Until recently, his company focused on SaaS clients, but it is now redirecting toward other industries that remain resilient and offer potential for digital transformation and automation. "There will also be a lot of work in compliance, and some other industries, as well as AI. Our strategy is now to go full on marketing and personal contact with the clients; there is no other way." At the moment of writing, the company was struggling to retain clients and was engaging in layoffs, attempting in many different ways to adapt to the new market reality.

Taken together, the early responses to crisis and reduced value capture opportunities were mostly met with different adaptation strategies and cost-cutting. However, some companies have also turned to the state for help. While companies mostly saw the state as a disruptive factor in the sector and opposed its involvement, in times of crisis, some firms appealed to the state for support. The Serbian IT Association[269] was founded in 2024, primarily to establish communication between the state and companies and to urge the state to support them, primarily through tax cuts. According to the representative of the association[270], the key issue the companies are facing is the lack of projects and the high cost of services Serbian companies can provide. He states:

> This is the first time the sector has been in a serious crisis. So far, the sector has been completely independent of the state, and we have never asked for anything, as we have successfully competed in the market. The state needs to acknowledge that a large number of companies will go under and that labour force cuts can be expected… Without support, such as tax cuts, we risk the whole company moving to other

[269] https://sita.org.rs/en/
[270] Interview conducted in January 2025

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countries, primarily neighbouring EU countries that are a bit more expensive but offer much greater stability and efficiency.

This has important implications for the state's role in value capture processes. As demonstrated previously, the role of the state in the sector has been primarily to provide educated labour for the growing industry, and to absorb companies' and workers' costs, mostly through tax mechanisms. Thus, as the state enabled the growth of the sector through regressive taxation and the tolerance of tax avoidance, effectively absorbing companies' costs, there are growing calls by companies to once again resort to that mechanism to help them survive the crisis. Ultimately, businesses see the state as a cost-absorbing buffer that enables them to capture value. While diminishing its role during expansion and seeing it as a disruptor snatching taxes, in times of contraction, the state is seen as a saviour.

As shown in this section, the current contraction led to another wave of consolidation in the sector, with larger companies managing to increase profits and get out of the crisis, while smaller companies´ profitability plunged with many of them being wiped out.

The end of the window of opportunity? workers navigating the new reality

The contraction phase also significantly affected the workers. Due to declining labour demand, their negotiating power is declining, and barriers to entry into the sector are increasing, further reducing their market power. This means lower negotiating power against capital and, consequently, lower value-capture opportunities. This shift is illustrated well with a commentary in one article about the crisis in the sector: “Today on Serbian IT Reddit channels, instead of questions like ‘What is the largest entry-level salary I can get? ', more and more we have questions such as ‘Did I make a mistake in my career choice?’[271]

As the IT sector offered high earnings and social mobility, the number of IT workers steadily increased. The crisis in the sector has dramatically altered the situation, making it increasingly

[271] As per Netokracija report: https://www.netokracija.rs/it-otkazi-2024-218114

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difficult for new entrants to secure jobs while rendering the positions of those already employed much more precarious. Although the total number of workers is not declining, it is rather stagnating,[272] with a significant number of entrants from abroad; this severely limits the number of new entrants to the sector and lowers workers' negotiating power. Thus, if in the integration and expansion phases workers were rapidly included in global production networks, in the contraction phase, they are excluded, left to navigate a constantly changing sector landscape.

Since the onset of the tech downturn, the global job market for software developers has become increasingly difficult, especially for early-career engineers and recent graduates, as illustrated by a recent research on the U.S. tech market by one of the most influential IT blogs.[273] In general, companies are hiring fewer people, while applications for jobs surged. Internship applications have more than doubled, and there was a tripling of applicants per developer job oppening. Senior engineers are no longer shopping around as they once did, and overall attrition is significantly lower. With more workers available than roles, compensation expectations have also adjusted. Overall performance expectations are rising, promotions are slowing down, and it is increasingly difficult for international applications to get visa sponsorship and covered relocation costs. Consequently, developers now think in terms of career security rather than job stability, and to adapt their skills, expectations, and strategies to the new realities the industry. Thus, strategies to obtain higher incomes described in the previous chapter are becoming less effective.[274]

The situation is also stark in Serbian companies, due to the layoffs and hiring freezes. For example, in 2023, the number of job postings on the leading IT job portal fell by 52% compared

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[272] As per Bloomberg Adria repor: https://rs.bloombergadria.com/biznis/kompanije/85722/sta-je-novo-na-it-trzistu-rada-u-srbiji/news
[273] As per Pragmatic Engineer blog: https://newsletter.pragmaticengineer.com/p/zirp-software-engineers
[274] As per Pragmatic Engineer blog: https://newsletter.pragmaticengineer.com/p/zirp-software-engineers

to 2022, while applications rose by 55%.[275] This downward trend continued in 2024, with a further 28% decline in open positions compared to the already low level in 2023. Meanwhile, the number of applications remained the same, with nearly six candidates competing for an open position.[276]

The crisis is particularly evident in the freelance and remote work sectors. The share of remote positions advertised on the key IT employment portal dropped from around 32% to 22% in 2023.[277] Although not yet available, this figure will likely be more pronounced in 2024 and 2025, according to the interviews I conducted with experts. For example, the main IT online medium declared that "the remote work had died in 2025," reflecting the disappearance of such positions.[278] The situation is similar in platform work. While the platform worker population grew for decades, demand for platform workers dropped significantly, as indicated in the previous sub-section. According to a project monitoring the number of platform workers in Serbia, while the number of platform workers securing jobs increased during the pandemic boom, it soon declined again. It declined by 18% in October 2023 compared to the first half of the year,[279] and then again by around 14% in October 2024 compared to 2023.[280]

Most of the interlocutors that I reached out to in 2024 and 2025, after the onset of the crisis, did not lose their jobs. Although thousands of people did lose their jobs, the layoffs in the sector were not dramatic, and the majority of those in medior and senior positions were safe. Still, the spectre of crisis was strong, and many felt insecure. Some of them did not plan to change jobs

[275] As per Helloworld portal data, reported by Netokracija: https://www.netokracija.rs/helloworld-oglasi-2023-214446
[276] As per Helloworld portal data, reported by Netokracija: https://www.netokracija.rs/helloworld-pad-it-oglasa-222086
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and began to prefer the security of their companies, in contrast to the short-term job hopping described throughout the thesis. Suddenly, the options shrank significantly around 2023. As per Veljko from Zvezda[281],

> I was planning to start working online after I had five years of experience and a portfolio on me. But since the crisis, I see that this is not really realistic as there is less and less work. At the moment, I think it's smartest to stick to Zvezda and wait until the crisis passes; it's still a secure job.

Other workers are thinking much more about the future and how to adapt to the current crisis. Krstan, also from Zvezda, for example, is aware that his outsourcing job might not be there in several months, and he is aiming to specialise in developing digital advertising tools – an area he has been working on for a few years. His goal is to develop more skills, find clients on the side, and secure work through expertise and personal connections. Thus, workers are thinking less in terms of how to capture more value, but as companies, they are focused on staying afloat in the market.

While the contraction is not as consequential for most people with jobs, the abrupt contraction of the sector is detrimental to entry-level workers and graduates. This is a widely acknowledged problem, as open positions for juniors in the sector have become almost non-existent.[282] The sudden drop of opportunities meant that the most promising industry suddenly closed its doors.

Interviews I conducted with several students and recent graduates revealed a significant gap between the high expectations they had entering software development and the harsh reality of the correction in the sector. Denis[283], a 24-year-old graduate from the RAF in Belgrade, was counting on a job in the industry as soon as he graduated, but found himself with the software developer diploma at the wrong moment. He recalls:

[281] Interview conducted in August 2023
[282] As per Forbes research: https://forbes.n1info.rs/biznis/presek-stanja-u-it-industriji-iz-ugla-jednog-juniora-mediora-i-seniora-zlatno-doba-je-proslo-niko-vise-nije-siguran/
[283] Interview conducted in September 2024

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> When I started university, I felt like a god. Everyone was talking about the IT and high salaries. People I knew got great jobs without even having degrees. And some students in their second or third year were already being hired by big companies, even dropping out of university because they were already earning serious money.

Yet since graduating in the summer of 2024, his experience has drastically diverged from those expectations.

> I started applying right after graduation, in July. But, it's almost been six months… I applied to over 30 jobs, not only in Belgrade but around Serbia, and some remote positions. But most companies never replied. I managed to get only two interviews. After the first one I never got the response from the HR again. For the second one I did well on the technical part, but they chose someone else in the end.

This prolonged struggle has led to growing disillusionment. Denis had believed that a software development degree would be enough, as it had been so for earlier generations.

Ivana[284], a third-year computer science student at FTN in Novi Sad, shares a similar experience. As she tells me, she was not entirely sure what she wanted to do after gymnasium. Since she had an affinity for math and physics, software development seemed like the obvious choice:

> Everyone around me was saying that IT is the future and that the money is there. Professors in the gymnasium said how their former students got amazing jobs in IT. So, this was the most logical choice…Also, when I started, there were all these IT companies around with internships, also different kinds of events, etc.

However, in her second year in 2023, she began to notice a shift, particularly in the third year, when she had already started searching for jobs:

> I can say that the jobs are almost nonexistent for beginners. Maybe this year I saw like 7, 8 positions in total. This is also what older students tell me, as they cannot find jobs either. I mean I am studying, but I am not sure if it will pay off in the end, so I am quite pessimistic.

At the moment of our conversation, she was thinking about ways to adapt to the market:

> I still want to finish my degree. But I don't want to do what everyone is doing, like web development, and I don't think it is smart to focus on that. AI and data science are becoming popular now, so I'm focusing on that... But to be honest, maybe I end up in other fields like UX design or digital marketing , who knows…I was also thinking about

[284] Interview conducted in October 2024

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> other things that I am interested in, like psychology, that won't be replaced by AI, I guess. But that is just like a plan D for now.

It is not only juniors who are wary of the future. While that was the case in 2023 when most of my interviews took place, the pessimism among most of the IT workers further increased in 2025. This is visible from online conversations on social media. For example, there was an increasing number of posts in IT Facebook communities and Reddit channels about making sense of the declining demand for work. This was particularly the case with freelancers, whose number of tasks collapsed, as well as with workers in companies discussing layoffs and client losses.

Particularly notable are a few LinkedIn posts bout the future of the profession. One notable post, for example, asked people how they are preparing for the mass unemployment in the sector, getting hundreds of comments. One female senior developer commented that she had bought a house in the mountains with a garden and chickens, planning to grow her own food in the future. Another senior developer working in the sector for over 20 years commented how he is not afraid of the future, as he survived the 1990s and he knows how to do all kinds of manual tasks, from driving a forklift to construction and plumbing. Another developer stated that he had already driven a cargo truck in Germany for over 400,000 km and is ready to do so again if necessary. While such a large-scale crisis is far from reality at the moment, and some IT workers often criticise these pessimistic outlooks for the sector, the general sentiment on social media revolves around concern for the future. While future trends are not easy to predict, this is indicative of a broader realisation among workers that their market power is declining.

Taken together, the experiences outlined in the subsection offer a look at the profound changes in the IT labour market. As described in previous chapters, the opportunities for labour and its increase in value capture followed closely the broader phases of labour demand and cost. While in the expansion phase, workers could have almost unlimited opportunities and ever-growing

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salaries, the broader crisis in the sector threatens their previous market power and forces many workers to think more openly about the future and adapt to it. Thus, workers' ability to capture value is significantly shaped by these external constraints, forcing them to adjust and navigate a changing market. What was once a guaranteed path for labour in the opportunity-scarce country became more like other industries with more limited opportunities, testifying to the unstable, cyclical nature of outsourcing, with opportunities mainly temporary.

After the boom: navigating the contraction phase of the Serbian IT sector

This chapter has described a contraction phase in the IT sector caused by the declining viability of the outsourcing model described throughout the thesis. Due to falling competitiveness and fluctuating labour demand, companies and workers saw their value-capture opportunities significantly shrink. In particular, larger companies and those with more market power managed to recover and shoot up their profitability, while smaller outsourcing companies saw their opportunities melt away. Similarly, with workers, juniors and new entrants to the sector were most affected. In contrast, more senior workers were less so, as everyone's negotiating power for higher salaries and better working conditions is declining in the contracting market.

While it is uncertain how the crisis will unfold, it is indicative of the broader dynamic of capitalism, particularly in the tech sector, which is constantly subjected to booms and busts, valuations and devaluations that ultimately dictate opportunities for workers and companies. Crucially, contraction further amplifies inequalities among workers and consolidates the market dominance of large companies, while hitting the smaller ones. In other words, the disarticulation and exclusion in production networks primarily refer to those with low market power. This is in line with broader dynamics of capitalism in which during crises the sectors go through repositioning, usuallzusually at the benefit of larger companies, strengthening their market positions.

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On top of this, the chapter illustrated the instability of weakly embedded outsourcing industries, which are particularly vulnerable to labour-demand changes in core economies. Due to declining competitiveness in the semi-peripheries based on labour price, the work is slowly withdrawing. Furthermore, throughout the thesis, I showed that the state was mostly viewed unfavourably by IT companies and that its role was rarely acknowledged in the growth of the sector. However, amid ongoing contraction, I also demonstrated that, with the crisis of the accumulation model, companies still need the state to absorb the effects of the downturn. Ultimately, the perception of the state reflects its perceived ability to support further value capture by companies through cost absorption, either through direct support or through a lack of interference and regulation.

Ultimately, the chapter presents a final phase of the story of the Serbian IT sector development. Instead of a linear story of integration into production networks and development, I focused on the disruption of such linear growth through concepts of articulation and disarticulation. The processes of outsourcing explored in this chapter and, more broadly, in the thesis show that the value-capture trajectories of companies and workers are temporary and contested, shaped by and subjected to broader economic processes. Value capture dynamics thus depend on a complex interplay among broader factors and phases of capital accumulation, with significant agency on the part of companies and workers in navigating these structural conditions. Thus, in the end, the economic development is non-linear and not guaranted, dictated by broader economic cycles and contestations. These dynamics will be explained in more detail in the main conclusion that follows.

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CONCLUSION: CONTESTED, TEMPORARY AND UNEVEN VALUE CAPTURE DYNAMICS IN THE SERBIAN IT SECTOR

In this thesis, I described the value-capture dynamics in the outsourcing-dominated Serbian IT sector. I show how these dynamics are embedded within different development sectoral phases or cycles, and thus how, temporarily, a constant contestation and competition for value capture occur between different actors. Furthermore, I show how these dynamics depend on actors navigating structural constraints in the networks. Ultimately, I paint a picture of contingent and non-linear economic development dynamics driven by IT outsourcing.

The thesis began by introducing two simple opposing narratives about the IT sector's proliferation in Serbia and the broader economic transformation it represented. On the one hand, an optimistic view celebrated outsourcing and integration into the global economy as a path to overall economic growth, prosperity, and innovation. The narrative was driven by an increasing number and size of local companies, constantly rising wages and successful exits of Serbian start-ups. This view primarily focused on positive spillovers for labour and development arising from integration into global production networks. On the other hand, a more pessimistic view mostly dismissed the sector as a site of cheap labour, exploited by foreign companies, with little contribution to broader economic development. This view primarily focused on the predominance of outsourcing, global wage gap, and the lack of upgrading among domestic companies, highlighting the sector´s dependent and peripheral position in global production networks.

While being conceptually incompatible with each other, both of these perspectives do manage to tell a story on different aspects of sectoral dynamics. This was the main conceptual puzzle I

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encountered while research the sector, which motivated me to focus on development and to disentangle what IT outsourcing brings to different actors. Throughout the thesis, I demonstrated that while explaining some parts of the equation, both perspectives remain simplistic and incomplete. The former overlooks the fragility and dependency of outsourcing, as well as its contested and asymmetrical nature, while the latter fails to explain the gains made by some actors and the changing nature of the sector.

I have instead offered a more complex account of the role of outsourcing in local economic development processes, showing who captures value, how, when and why. I did this by analysing different moments of structural articulation in production networks in the local IT sector and by illustrating how individual actors navigate such structures to improve their market position. From a smacro perspective, I show how value capture dynamics are structured by key cycles of sectoral development, including integration, expansion and the contraction phases. These phases are constructed through the interplay of two main drivers: global labour demand and changes in local labour prices.

In the integration phase, the availability of abundant, skilled but cheap labour intersected with rising global demand for IT services. International firms sought to cut costs by moving standardised programming and support functions to cheaper locations. Serbia, with its legacy of strong technical education and relatively low wages, as well as its physical, cultural, and linguistic proximity to client countries, offered comparative advantages for outsourcing. This phase enabled high-value capture opportunities for intermediaries or brokers connecting labour supply and demand. These were primarily individuals, subcontracting companies, and online platforms that provided labour to companies abroad and managed to amass significant economic rents in the process, but also created market through their intermediation processes and expanded value capture opportunities for other actors in the longer time horizon. Initially, the state mostly acted as a cost absorber through favourable tax treatment for both companies

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and workers, while workers retained relatively modest shares of the value in outsourcing arrangements.

In the expansion phase, the global demand for labour remained strong and due to the influx of multinational companies and the growth of local companies, local competition for workers also intensified. This meant a concentration of market power in the hands of multinational companies able to grab the most desirable workers and a challenge for local subcontracting companies to transform and remain competitive. This, alongside growing global competition for clients, propped up local companies to upgrade to higher value activities, but, as demonstrated, such processes were isolated, contested, and contingent upon global economic assymetries. Importantly, primarily due to competition for labour, there was a rapid wage growth and increased opportunities for workers. The role of the state in upgrading processes was notable, but however, remained limited.

Finally, in the contraction phase, the demand for labour declined significantly, while labour prices remained high. The global demand faltered due to prior overhiring, rising interest rates, and AI-driven automation. Combined with high labour prices, the competitiveness of most local IT firms declined, exposing the structural fragility of outsourcing as a developmental path. However, the effects of this contraction were exceptionally uneven: while large and specialised firms mostly adapted to the crisis and senior workers retained their strong market position, smaller companies and junior workers saw their opportunities significantly shrink. Thus, in the contraction phase, those with lower market power were excluded from the network, while the market consolidated at the hands of the large players. Taken together, the articulation of these three phases supports understanding of the structural conditions that condition value capture dynamics.

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Building upon this structural view I further illustrate the complexity of struggles of value capture and the ways in which firms and workers actively navigate them. Here lies the second contribution of the thesis: demonstrating that value capture is contested and temporary , ultimately dependent on the struggles and strategies of firms and workers within given structural conditions. Value capture emerges through multiple mechanisms in a constantly competitive, changing environment. Conflicts unfold differently at each stage of the cycle, involving different actors and mechanisms, but they consistently reveal outsourcing as a site of struggle over who appropriates value. The actors in the outsourcing process pursued differing value-capture strategies across the development phases.

In line with GPN logic, the lead firms or clients hold the most power over value capture in the network, and the sector dynamic is mainly driven by their value-capture considerations. In the integration phase, they arbitraged uneven development across the globe, capturing large surpluses based on large labour price differentials, even accounting for large value capture by intermediaries. In the expansion phase, they still benefited from labour price differences and suppliers' increased capabilities. Due to low interest rates and growing investments in IT, outsourcing software development was a profitable strategy. Crucially, the strategies of lead firms also triggered the contraction; when the cost/benefit ratio of outsourcing increased, due to reduced labour needs, automation, and legislation, these companies reduced demand, leading to a slowdown in outsourcing-dominated IT sectors like the Serbian one.

As described throughout the thesis, mediators played a crucial role in the development of the sector – primarily online labour platforms and subcontracting companies. What these actors have in common is that they both facilitated outsourcing by reducing transaction costs for other companies and workers, while in the process, they accrued economic rents through intermediation. In the early stages of sectoral development, platforms were relevant because they could connect clients in the West to workers in Serbia effectively in a low-maturity market,

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but their power to intermediate declined over time. Outsourcing through platforms represented the lowest form of outsourcing, with minimal value capture opportunities for the local economy, only through workers' incomes. Subcontracting companies grew in importance over time as they were able to provide and supervise labour at scale, becoming the dominant players in the sector, employing tens of thousands of workers. In the early stages, with low global interconnections, both of these mediators were able to capture large shares of value as middlemen, charging large margins on otherwise low wages. However, as the market matured and competition for workers intensified, their preferential market positions based on exclusive access to labour declined. As a result, opportunities opened up for workers to circumvent intermediaries and to also have more power in negotiating their salaries. This, in the end, led to a significant reduction of the role of platforms, while subcontracting companies were forced to adapt by scaling, upgrading or specialising to remain competitive. As shown throughout the thesis, these companies employed numerous strategies to remain competitive, navigating constraints and leveraging the advantages of their market position.

Workers' value capture followed a bell curve through different phases. Initially, they had limited bargaining power, accepting low wages relative to productivity, because opportunities on the local labour market were limited and intermediaries had exclusive access to foreign clients. However, in the expansion phase, they experienced a golden period as labour scarcity, intense competition for workers and expanded options allowed wages to rise sharply. In this stage, workers also actively captured value through strategies such as negotiating higher salaries through switching firms or simply leveraging uneven geographies to their advantage by finding better-paid remote work. Yet this general empowerment of workers was temporary. In the contraction phase, as demand fell and labour prices remained high, their bargaining power eroded, leading them to survival mode in the increasingly challenging labour market. As shown throughout the thesis, within the structural constraints, individual workers actively

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reworked conditions under which they labour, leveraging various strategies to maximise their value capture.

The state had a dual role in these value capture processes – while it played a significant and often invisible role in value creation and sectoral growth during the development phase, it did not meaningfully support the upgrading and development of the sector. The first key contribution of the state was producing a pool of skilled labour through widespread STEM education - a crucial condition for the integration and expansion of the sector. The second crucial element was regressive taxation and the tolerance of tax avoidance, which absorbed the costs of both companies and workers, as well as various subsidies and tax write-offs. However, the state played a much smaller role in guiding the sector's development. In the expansion phase, it attempted to tighten tax collection and engaged in some attempts to support the upgrading of the sector, but ultimately played a rather reactive and limited role in the process of supporting sectoral development. This was due to the sector's dependent position in global production networks, weak local economic capacities, and the lack of a political-economic model and state capacities to facilitate economic development. In the contraction phase, the absence of a coherent industrial policy left the sector at the mercy of capital flight, with firms seeking further cost absorption from the state through taxes. Ultimately, despite the negative perception of the state and its diminishing role in the sector, this reveals the reliance of outsourcing-focused firms on it for cost reduction and competitiveness.

This phased overview of value capture dynamics outlines their temporary nature. Local companies lose their comparative advantage with the maturation of markets, rising wages and the coming of competitors, platforms lose the ability to generate rents with massive removal of work proliferation and sector maturation, while workers previously with well-paid, stable jobs do erode when there is a threat of capital fleeing. This reflects a broader treadmill logic of capitalism, where value capture is based on relative and temporary advantages constantly

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undermined by competition and market flows, requiring new strategies of adaptation. This adaptation was reflected in companies seeking to upgrade or specialise, while workers sought different forms of market mobility, including remote work, job switching, or founding their own companies.

On top of being contested and temporary, the value capture dynamics are also uneven and embedded in global economic structures. While lead firms in core economies dictate the terms of value capture, local subcontracting companies and workers struggle to capture it in brief windows of opportunity that appear to them at different development phases. Furthermore, the market is dominated by multinational companies, and startups are relocating abroad in large numbers, while local companies rarely manage to upgrade to higher-value functions. Thus, while integration into global production networks provided significant opportunities for value capture for local firms and workers, it was limited, with most economic rents accruing at the upper ends of production networks in core economies.

While I mostly relied on the global production networks literature to explain value capture, I also demonstrated some of its limitations. GPN is useful for disentangling more complex trajectories of development by showing how firms and other actors are embedded in production networks with complex governance structures and value-creation and capture dynamics. However, the approach had significant limitations in its conception of value, theorisation of labour, and consideration of broader economic structures and economic cycles.

Firstly, I linked to the GPN the discussion on value, conceptualised interchangeably through economic rents and surpluses. I have not opted for a single take on value, but instead adopted a hybrid approach, demonstrating how different notions of value can be useful for explaining sectoral dynamics. I showed how both economic rents and surpluses can be helpful for conceptualising value capture by firms, as they capture both interfirm competition and capital-

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labour relations, and how taxes contribute to the value-capture opportunities of firms. At the same time, I introduced a labour perspective on value capture, not concerned only with salaries but also with work conditions more broadly and the possibilities of workers transitioning into rentiers. Although I demonstrated the empirical usefulness of such a hybrid approach to value capture, I am also aware of the lack of theoretical coherence it resulted in. Primarily, I did not develop a unified, coherent framework of value creation and capture, but rather primarily described mechanisms. However, such an approach would have been more limiting to accounting for the fuller picture of the IT outsourcing in Serbia I aimed to capture. Thus ultimately I demonstrate why multiple conceptualisations of value exist in the GPN in the first place – because they are individually incomplete and capture only limited angles of the value capture processes.

Beyond value, I also introduced serious consideration of labour in value capture processes, which was largely lacking in the GPN literature - one of the main critiques of this approach. Throughout the thesis, I have demonstrated that labour should be conceptualised as a source of value, paying particular attention to the extraction of surplus through the labour process. Conversely, I also demonstrated that workers, like companies, actively navigate the changing market, attempting to maximise their value capture. While primarily focused on increasing incomes, their logic is not pure economistic as that of companies, as their value capture also meant other components, including improved working conditions. Thus, I add to the firm-centric, top-down approach by highlighting the centrality of labour in outsourcing processes.

Furthermore, I supplemented the GPN theory, which focused mainly on firm networks, with other theories of uneven development to demonstrate the contingence of value-capture dynamics on broader economic structures. Going beyond network analogy, I showed how network dynamics are still conditioned broader political-economic dynamics beyond this approach. I outlined the specificities of outsourcing in the semi-peripheral post-socialist

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context, including different enablers and obstacles to value capture for firms and workers. Furthermore, I illustrated the see-saw dynamics of valuation and devaluation that dictate the sectoral phases and the ultimate prospects for firms and labour.

On top of uneven development, I have demonstrated the importance of global economic cycles for local value capture. The cyclical dynamics observed in the Serbian IT sector can be understood as locally mediated expressions of broader rhythms of capitalist development. The global growth unfolds through alternating phases of expansion and correction, driven by technological change, investment flows, and market saturation. Serbia's integration, expansion, and contraction phases thus present a ripple of these global tendencies, but reflecting the country's semi-peripheral position and the agency of domestic actors. This results in a cyclical pattern that is global in its origins, but refracted through specific local political, social and economic configurations that define how value is created and captured.

Ultimately, I have demonstrated how economic development can be seen beyond the visions of growth spillovers through integration into global production, as well as global economic structures and flows of surpluses from peripheries to the core. The development can be better understood as a patchy, contested process embedded in uneven geographies, in which different actors capture value depending on structural conditions and individual strategies for navigating markets. Development is thus contingent and contested and it rather shows through value capture opportunities for different actors at particular places in particular time. The interlocutors of my thesis were very much aware of these dynamics, focusing on short-term and individual value capture in the given market circumstances, knowing that what they do is ultimately ephemeral and in constant flux.

Rather than providing a comprehensive and definitive account of value capture processes in outsourcing, this thesis raised several questions and opened up potential research avenues. One

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possible conceptual research direction beyond the scope of this thesis is the development of a framework to account for the heterogeneous value-capture dynamics discussed in this research. From an empirical perspective, due to ongoing processes of decoupling in the global economy and the reshoring of work, it would be crucial to further explore developments in what I refer to as the contraction phase, where this research only scratched the surface based on available data. While this thesis provided a broad overview of value capture dynamics and focused on mapping the mechanisms, my future research will aim to further develop more specific arguments developed in this thesis and expand the empirical reach of the analysis. Primarily, I aim to significantly increase the scope of quantitative data collected, but also qualitative to obtain more generalisable insights on the evolution of the firm dynamic.

I believe the thesis contributes to debates on the IT sector and development in Serbia, going beyond one-sided narratives and providing a multi-perspective view on the benefits and perils of the IT industry. Beyond the Serbian case, the thesis raises important questions unstable and ephemeral nature of IT outsourcing lifecycle in countries dependent on this industry such as Poland, Philippines or India. In addition, it also contributes to broader discussions on economic development and possibilities of upgrading through outsourcing. This is particularly relevant at the moment when the global capitalist model based on rampant outsourcing and endless expansion of global production networks is being put to question under the conditions of unravelling deglobalisation.

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