



THE BILLION IN THE DISTANCE: CENTRAL ASIAN IT EXPORTS AND STRATEGIES FOR GROWING THEM

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ABOUT THIS REPORT

A decade ago, it would not have made sense to speak of Central Asian export-oriented IT as a single phenomenon. Today, it does: although Tajikistan is only beginning to take off and Turkmenistan would need to address several fundamentals in order to make IT growth possible, Kazakhstan, Kyrgyzstan, and Uzbekistan have all been growing rapidly for the last several years, and that growth looks set to continue.

We wrote this report to find out more: to see how export-oriented IT has been developing across all five Central Asian countries, where it stands today, and what might await it in the future. What are the export volumes? What has their growth been, and what is driving this growth? What has already been done to help growth, and what else could be done? What, in other words, is the big picture as the region's export-oriented IT begins to come into its own, with single-digit millions of exports turning into tens, hundreds, and eventually, perhaps, billions and beyond?

To answer these and other questions, we combed through numerous data sources, and—most importantly—talked to more than 40 experts from every country in the region, including government officials, policy experts, and CEOs and senior managers of the largest global IT companies operating in Central Asia, as well as with local tech entrepreneurs.

The result of this work is the first in-depth study to examine the Central Asian region's export-oriented IT as a whole. The report's analysis and recommendations will help country governments, international development agencies and financial institutions, global and local IT players find the right tools to grow an export-oriented IT industry in the Central Asian region. These tools will be useful for the development of both country and regional strategies by all the stakeholders listed here.

StrategEast Center for a New Economy, a non-profit organization working to strengthen the values of inclusivity, connectivity, gender equality, and equal opportunities in Eurasian countries through the digital economy, carried out work on this report. The project team included Levan Nadibaidze (lead researcher and writer), Lidia Shavlo (researcher), Michael Sheitelman (concept and strategic guidance), and Anna Zub (coordination). The work was conducted from September-December 2022 and reflects conditions that were current at that time.

THE OVERALL PICTURE: THE BEGINNINGS OF GROWTH

If we were to think about export-oriented IT in Central Asia, we might think of Kazakhstan, Kyrgyzstan, and Uzbekistan together on one end, Turkmenistan on the other, and Tajikistan somewhere in between (though closer to the first three than to Turkmenistan).

Kazakhstan, Kyrgyzstan, and Uzbekistan all have what we might call a nascent export-focused IT industry. All three have large foreign companies in low-tax zones known as IT parks that employ hundreds or even thousands of people. Kyrgyzstan and Uzbekistan both have one or two domestic product companies, each known for international export successes. Kyrgyzstan also has two domestic export-focused companies that have grown past 100 developers (one is independent; the other was acquired by a global company). Governments in all three countries are trying to create conditions for growth; Kazakhstan and Uzbekistan are also investing non-trivial resources. And exports are growing: in 2022, Kyrgyzstan expects \$40m, Uzbekistan around \$140m, and Kazakhstan as much as \$200m, compared to \$25m/\$46m/\$50m the previous year and official figures that were next-to-nothing just a few years earlier.¹

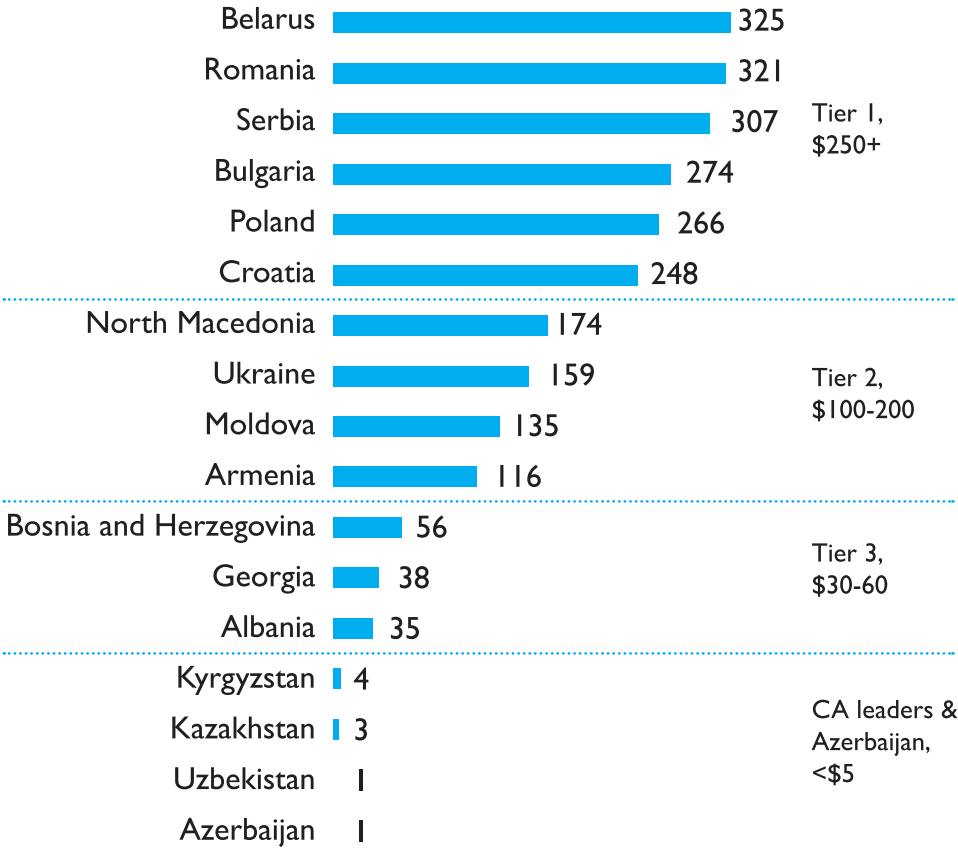
Tajikistan has not yet reached the level of the first three countries. It does not have large international companies or IT parks; most export-oriented IT work is small-scale and in the shadows, not least because of high taxes. The one company officially focusing on software services exports has less than 30 developers. Only one company, a bank, is doing serious export-focused product work (which it can afford because it makes most of its money as a bank and not as an IT company); another much smaller company is trying to do the same. The Internet is a big constraint. That said, the government is reportedly considering paying more attention to IT and setting up an IT park based on its neighbors' model; if and when it does, growth might pick up.

Turkmenistan has yet to start IT growth: the only export-oriented IT that exists in the country is through freelancers. Some local IT companies are trying to diversify into exports but have yet to succeed. In order for IT exports to be viable, the government would need to address—at least for the IT industry—the issue of currency controls, the quality of the Internet and the restrictions on accessing it, and its current visa policy, which makes it difficult for foreigners to visit the country.

The growth that is already underway is cause for some excitement: an industry is emerging where only a few years ago, it did not exist. That said, it is important to remember that a lot of the 2021-2022 growth in Kazakhstan, Kyrgyzstan, and Uzbekistan came from two one-off events: the Covid-19 pandemic (which made foreign companies more willing to hire remote developers), and Russia's invasion of Ukraine (which drove large numbers of Russian and somewhat fewer Belarusian companies and individual developers to move to Central Asia, bringing their US and European client connections and incomes with them). The boost from these two events will not be repeated—and the boost from the 2022 movement of persons will likely grow smaller as some people fleeing Russia and Belarus move to other countries. Secondly, even with this twin boost, in per capita terms, Central Asia's leading countries are currently where Belarus and Ukraine stood in 2006-2007, and where Romania, Poland, or Bulgaria were even before that. There is a lot of ground left to cover (see chart: Per capita computer services exports).

¹According to the respective countries' IT parks

Per capita computer services exports



UNCTAD, 2021; data for the three Central Asian countries are from their IT parks²

That does not mean that the countries of Central Asia cannot reach or even surpass Eastern European levels of per capita IT exports. Some of the groundwork has already been laid, but for Kazakhstan, Kyrgyzstan, Uzbekistan, and Tajikistan (if and when the country’s government decides to speed up IT development), building on it will require **improving existing foundations, attracting developers, forcing an industry upgrade, and feeding its continuing growth.**

Improving the foundations requires:

- Addressing **infrastructure changes**, including fixing unreliable and/or slow **Internet** (in Uzbekistan and especially Tajikistan, and—in both—especially in areas outside of large cities) or occasional **electricity outages** (in all countries of the region);
- **Improving English** instruction in both public schools and elsewhere;
- **Simplifying immigration rules** for non-CIS citizens and/or qualified workers in non-IT specialties in addition to previous streamlining efforts;
- Maintaining **country reputations** as places with which it is broadly acceptable to do business;
- Maintaining **preferential IT taxation** where it is already present (Kazakhstan, Kyrgyzstan, Uzbekistan) or considering introducing it where it is not (Tajikistan);

²We do not show Tajikistan and Turkmenistan because official country figures are not available and the UNCTAD dataset shows only \$180,000 in exports for Tajikistan and does not include Turkmenistan.

- Maintaining **special legal regimes** where they were introduced (Kazakhstan) and considering them where they do not yet exist (elsewhere in the region, though not as substitutes for long-term judicial reform);
- Continuing to work on **fundamentals like business climate, school education, and quality of life.**

Attracting the necessary developers requires:

- Training **large numbers of junior developers** while being mindful of the **number of senior/lead developers** needed to train them on the job and manage their work;
- Improving **formal IT education** while striking a balance between the present-day market and long-term fundamental skills.

Upgrading the industry requires:

- Tying **financial incentives** for the IT industry to its **export performance** (which Kyrgyzstan already has done, but the others have not;)
- Continuing to **attract large international software engineering companies** while making sure (through **business skill training** and/or attracting business-minded expats or emigres) that local service companies also grow and scale;
- Laying the **foundations for product growth**: boosting the number of early-stage startups through **mentoring, acceleration, and angel investing** (especially by teaching local investors why one would want to be an angel investor in the first place) and boosting the number of startups that become viable through **venture capital funding** (including, possibly, through governmental upside-capped co-investment programs).

Finally, **feeding the growth** requires:

- Having **single entities drive IT development** (which is happening in the three leading countries; it is not yet taking place in Tajikistan);
- Working with **local IT and business associations** to strengthen industry engagement in IT growth planning (currently only happening in Kyrgyzstan)
- Supporting a **multitude of community organizations** necessary for a healthy IT ecosystem (happening to a limited extent);
- Attracting **digital nomads** by further streamlining immigration processes (across the region) and fixing issues with the Internet (particularly in Tajikistan) (already happening to a limited extent);
- Promoting the industry abroad as having a **particular value proposition** (already happening, but not at the necessary scale).

Turkmenistan will need to work on all of these issues if and when its government decides that IT development is a priority and addresses currency control, the Internet, and migration policy issues that are the precondition for growing export-oriented IT—at least for the IT industry.

INTRODUCTION:

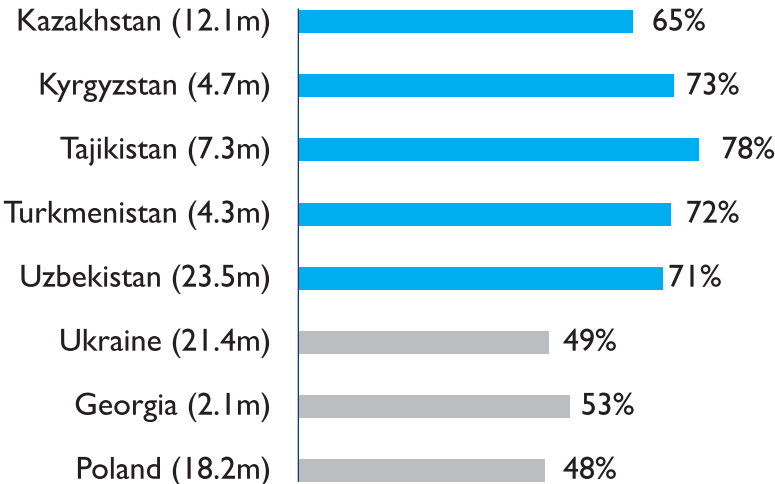
WHY EXPORT-ORIENTED IT MATTERS

Why IT, why export-oriented IT, and why export-oriented IT with foreign involvement? The short answer is: IT creates jobs, export-oriented IT diversifies a country's exports, foreign involvement accomplishes this more quickly than would otherwise be possible, and jobs beyond IT appear, too. This would be important anywhere, but it is particularly important in all five Central Asian countries.

Job creation in IT is important because all of these countries have high proportions of young people relative to, say, the countries of Eastern Europe (see chart: Shares of the population under 40 in Central Asia and selected Eastern European countries). For those people, the lack of jobs is sometimes a motivation to emigrate; of those who stay, many subsist in various kinds of low-skill, low-security jobs like construction or urban services like driving taxis or delivering meals (especially where hydrocarbon rents can fund hundreds of thousands of such jobs). Emigration represents wasted potential (with only a slight possibility of eventual return); low-skilled, low-security employment represents both wasted potential and a risk of radicalization, whether religious or otherwise. Creating jobs in IT makes it possible for fewer people to leave and for more people to enjoy better working conditions, better pay, and better use of their talents—and also makes sure that those that stay are the most capable and driven members of society (in Central Asia's social context, it also helps that many of these jobs can be done from home, which makes them more attractive for women).

Shares of the population under 40 in Central Asia and selected Eastern European countries

2019, percent of the total population; the number in parentheses shows the absolute value of the population under 40



Source: populationpyramid.net

Export-oriented IT jobs—as opposed to the domestically-oriented kind—are important because they help diversify exports away from volatile commodities. All Central Asian countries rely heavily on commodity exports, be it crude oil (for Kazakhstan), gold (for Kyrgyzstan, Uzbekistan, and Tajikistan), or natural gas (for Turkmenistan). These commodities pay for imports, but their prices are unstable: gold fell from a high of \$2,400 per ounce in 2011 to \$1,350 in 2015, then rose to \$2,260 in 2020 and fell to under \$1,800 in

2022. Oil swings even more wildly: from a high of nearly \$140 per barrel in 2013 to a low of \$22 in 2020, then almost \$120 in early 2022 and down to \$80 later that same year. Swings in commodity prices can seriously damage a country's balance of payments—the difference between its imports and its exports—leading to high inflation and a drop in imports (this is further exacerbated due to the fact that commodities tend to go down along with the rest of the global economy, which is when other parts of Central Asian economies are more vulnerable, as well). The prices of IT services do not fluctuate to the same degree (the volumes may vary, but less dramatically), and they can even be countercyclical. In 2020, when Covid first appeared, IT services were one of the few areas to grow as companies shifted to remote work (and IT salaries in developing countries grew especially rapidly because many Western companies suddenly had to become comfortable hiring remote developers). Those who believe IT exports cannot compete with commodities in scale should think again: in 2021, Ukraine exported slightly more IT services than Uzbekistan exported in gold (its main export): \$6.9bn to \$6.5bn.³ Ukraine's population is not that much larger than Uzbekistan's—44 million to 35 million—and its population of people under 40 is actually smaller (21 million in Ukraine versus 23 million in Uzbekistan). IT, to be fair, would find it hard to compete with Kazakhstan's petroleum exports (\$25bn in 2020)—Poland, the Eastern European leader, exported \$10bn worth of IT services in 2021—but even there, it could help make a serious improvement.⁴

An export-oriented IT industry with foreign involvement grows faster than an industry without such involvement would. Foreigners bring skills that not many locals might have when a country begins to build its IT industry: the skills, for instance, of managing software development processes (while a junior developer can be trained from scratch in six months, there is no way to train a software development manager except by having him or her manage developers for several years; here, as in most activities, one learns by doing). Foreigners, of course, can also bring capital—though that becomes more important later on in a country's development path when its IT industry switches from outsourcing-like activities to developing its own products. Most importantly, foreigners—or locals with extensive foreign experience—bring with them an understanding of what foreign markets need. That, by definition, is *sine qua non* to building an export-oriented industry: if one is going to export, i.e., to sell to foreigners, one needs to know what those foreigners want. And one cannot know what they want—let alone what they might want of something that they do not yet have—unless one has spent a lot of time among them, for the way their economies and societies are run is very different from that of Central Asia. One can try to figure out the foreigners' needs through trial and error—but it would be far more efficient to skip the trial and error phase and simply bring in the knowledge when it is already available.

Finally, well-paying IT jobs create prosperity beyond IT: the money spent by IT specialists is money earned by other people, both in existing jobs and new ones. Of course any jobs will achieve this to a certain extent, but if a job pays more, the effects will be greater, and if a job is held by someone young who likes to spend money, they will be greater yet. Just how big those effects are is a matter of debate: studies from the US talk about a range that is anywhere between one extra job created for each new job in IT and four or even five (the lower range studies argue that a successful IT industry dampens its own success because it pushes up housing values and the like, making people in non-IT jobs spend less than they otherwise would, even if they are earning more).⁵ How well those numbers would translate to Central Asia is not clear—there is currently no data to look at yet—but some spillover will occur, and given the wage premium, it is likely to be greater than it is for the average job in the region (and greater yet given that young IT workers tend to spend freely on urban conveniences and entertainment).

³ Ukraine figure: computer services export from UNCTAD; Uzbekistan figure: Observatory of Economic Complexity (OEC)

⁴ Kazakhstan figure: OEC; Poland figure: UNCTAD

⁵ For the higher end estimates, see Bay Area Council Economic Institute, *Technology Works: High-Tech Employment and Wages in the United States* (2012) and Moretti, E. (2011), *Local Multipliers*, *American Economic Review*, 100(2), 373–377. For the lower end, see Bartik, T. and Sotherland, N. (2019), *Local Job Multipliers in the United States: Variation with Local Characteristics and with High-Tech Shocks*, Upjohn Institute Working Paper and Osman, T. and Kemeny, T. (2022), *Local Job Multipliers Revisited*, *Journal of Regional Science*, 62, 150–170.

Export-oriented IT, to be sure, cannot be the only answer to a country's economic development dilemma. It needs to be part of a broader strategy that also includes export-oriented manufacturing as well as non-IT service industries (these, too, should be export-oriented as much as possible, though the possibilities for that are much lower: haircuts and car repairs do not travel, and even lawyers have a hard time exporting their services abroad). In its more advanced stages, an IT industry actually cannot exist without strong manufacturing and non-IT services (and those, in turn, cannot exist without IT)—at the very least, no country has managed to develop one without the other. And there are difficulties with IT, too. To work well, it requires a lot more of a country's digital infrastructure and education system than manufacturing or non-IT services do. A barely literate 18-year-old who only speaks his or her native language can certainly work on a factory floor—but he or she cannot be turned into a developer. Existing roads, however rutted, can suffice to get physical goods to where they need to get or can have taxi drivers driving on them—but slow or unreliable Internet makes most kinds of export-oriented IT work simply impossible. And even if an IT industry is working well, it can bring about the same kinds of fissures as an unequal distribution of hydrocarbon rents: absent mechanisms for the redistribution and reinvestment of wealth—proper taxation, that is to say—fast growth in IT can give a lot to a few and leave the rest to serve as couriers and waiters, reinforcing the same risks of wasted human potential and radicalization that were already there before IT came to town.

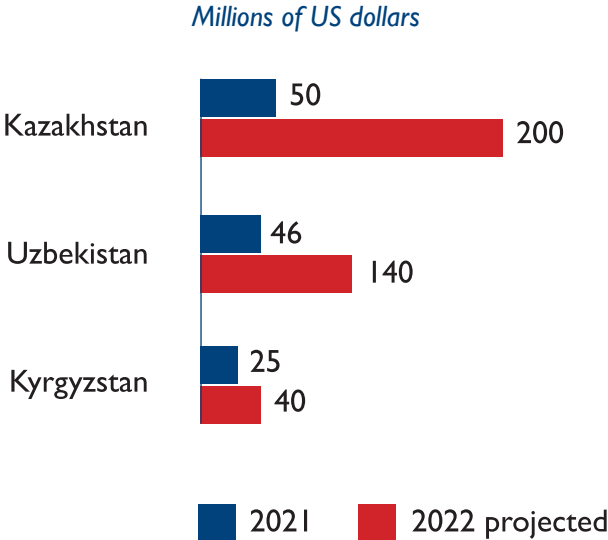
That said, and especially in the earlier stages of economic development, IT also has advantages. Unlike with manufacturing, a country building up its IT does not need to be either physically proximate to wealthy markets (if one is to rely on near-shoring from wealthier countries, as Hungary and Serbia do with Germany) or be large enough and logistically well connected enough to be attractive regardless of distance (like China or the maritime areas of Southeast Asia). Capital requirements in IT are very low (at least for basic operations). And the knowledge on which IT value creation depends is, for the most part, available publicly and for free, even at the cutting edge (which is not true of most industrial technologies). IT, whether export-oriented or not, will not be a panacea for a country's economic problems—but it can be a large part of the answer, and there is no reason not to go after it.

TAKING STOCK: EXPORT LEVELS, STRUCTURAL STATE, AND THE DISTANCE TO COVER

IT exports in Central Asia: fast growth from a low base

Within just a few years, Kazakhstan, Kyrgyzstan, and Uzbekistan have managed to build noteworthy IT export industries from the ground up. (Tajikistan has very little in what is officially registered, and Turkmenistan does not appear in the datasets we relied on). In 2021, based on the data from the three countries' IT parks (the organizations that administer their special IT tax regimes), Kazakhstan was at around \$50m, Uzbekistan at \$46m, and Kyrgyzstan at \$25m. Things are looking up for 2022: based on the first ten months of the year, Kyrgyzstan was targeting around \$40m by year-end, Uzbekistan around \$140m, and Kazakhstan as much as \$200m (see chart: Central Asian IT park exports, 2021-2022).⁶ The exports mostly go to the US and Western Europe: Uzbekistan, for instance, sent 85 percent of its exports to the US in 2021.⁷

Central Asian IT park exports, 2021-2022



Source: Astana Hub, Uzbek IT Park, Kyrgyz High Technology Park.

This rapid increase in export figures should be approached with some caution: 2021 and 2022 saw one-off events that boosted the value of official exports. The first was global: the Covid pandemic made foreign companies much more willing to hire remote IT workers. Of course, they had hired some of these workers even before the pandemic. Still, there were lots of situations in which certain kinds of work would only be done by those who were physically on the company premises or at least in the same country as the client—whether because of security requirements or because the company was used

⁶The parks do not tend to include individual freelancers working for export, so the real numbers are higher yet. No one knows exactly how much higher; especially because a lot of the freelancers tend to be paid in foreign bank accounts in order to avoid paying taxes. But a few experts believe that the volume is likely on the order of a third or at most a half of the volume of IT parks.

⁷ See <https://it-park.uz/en/itpark/news/the-ceos-of-international-it-companies-were-acquainted-with-the-conditions-in-the-newly-established-it-park-uzbekistan-complex-and-exchanged-views-on-the-prospects-of-cooperation>

to working this way. The pandemic and the lockdowns that came with it forced companies to be more open to working with remote IT specialists, and countries that could offer cheap workers benefited. In Kyrgyzstan, for instance, one CEO told us that wages for mid-senior developers shot up from \$2,000 a month to \$4,000 a month as US companies came into the market directly instead of, at best, relying on Ukrainian and Polish middlemen. The second change, from 2022, was more regional in nature: Kazakhstan, Kyrgyzstan, Uzbekistan, and, to some extent, Tajikistan saw thousands of IT specialists come to their countries as a result of Russia's invasion of Ukraine (the exact numbers are still unknown). They were mostly Russian, with smaller numbers of Belarusians and even smaller numbers of Ukrainians (because Ukrainian men—and developers are mostly men—have generally not been allowed to leave Ukraine since Russia's invasion). Newly arrived companies and individual developers tended to bring their clients with them (many, especially those who came before Russia declared military mobilization, left in the first place because they were working for US and European clients that no longer wanted to do business with Russia). Freelancer arrivals did not generally join IT parks, but companies did, which gave impetus to a huge jump in revenue across all three countries. Combined with the 2021-2022 entry of large foreign software engineering players into some or all of the three countries, revenues of companies in IT parks jumped further yet, approximately doubling in Kyrgyzstan to an estimated \$50m, and quadrupling in Kazakhstan to an estimated \$200m (which would make sense considering that Kazakhstan, as the only Central Asian country to have a border with Russia and the one with the highest regional share of ethnic Russians and Russian speakers, received the greater share of Russian migrants). Without Russian migration and the entry of new players, the growth would have been far less: at least in Kazakhstan's case, according to the Astana Hub CEO's estimate, organic growth—sans large, new outsourcers and the arrival of Russian migrants—would have been on the order of 30-40 percent year-on-year (it is worth noting that Kazakhstan, as the greatest beneficiary of the Russian exodus, could also have the greatest exposure to the risks of Russian immigrants moving on to other countries—which, if it happens at scale, would probably dent growth numbers in the next 2-3 years).

As for Tajikistan and Turkmenistan, official Tajik IT exports are very low—they stand at \$180,000 according to UNCTAD computer services export data for 2021—while Turkmenistan does not appear in the UNCTAD dataset at all (the experts with whom we spoke suggested that if there are any officially registered IT exports, they are likely very small). In both countries, to be fair, there is a number of freelancers working through platforms like Upwork and through personal connections for clients in Russia and the West, and whose earnings do not appear in official export statistics. The exact figures are unknown—but given the state of the IT market, it is unlikely that there are more than low hundreds (or even high dozens) in Turkmenistan and perhaps high hundreds in Tajikistan.

The structural state: the beginnings of an industry

Raw export numbers do not tell the whole story: they may be growing, but what exactly is driving the growth? For obvious trade secrecy reasons, IT parks do not disclose how much individual companies contribute to their export volumes. Still, large outsourcers like EPAM (in all three countries) and Exadel (in Uzbekistan), employing several thousand developers between themselves probably drive the largest share, perhaps to the tune of a third or even a half of the overall total. At a level below—or in the case of Kyrgyzstan, comparable to them—there are mid-size companies of 100-200 developers each (in Kyrgyzstan, Mad Devs, iTechArt, or Kanda Software; in Uzbekistan, iTransition). At yet another level below that, there are the smaller companies: in the Kyrgyz case, operators like Attractor Software or Unique Tech, with teams that are either on the order of 20 developers or so (former) or assembled ad hoc (latter); in Kazakhstan, a company like Akhter Studios, with around 40 developers; in Tajikistan, a company like Silk Road Professionals with around 30. Finally, there also are business process outsourcing companies, some of which can be quite large (at least in the case of Uzbekistan, where companies like Revotech account for around a third of the IT park revenue thanks in large part to the services they provide to ethnic Uzbeks working in the US trucking industry).

To make sense of where the countries of Central Asia are in structural terms, one can think of three stages of IT development that countries usually go through as their export-focused IT industries grow.

- At the **first stage**, export-oriented work is done by isolated individuals working either through personal connections or platforms like Upwork (and usually hiding from the tax authorities as they do that). If there are domestic export-focused firms, they are small—on the order of 10-20 people—and they do not advertise their origins, preferring instead to hide behind addresses in London or Silicon Valley. Foreign involvement is either absent or very limited. Developers with formal jobs tend to work for banks or telecom companies since those have the most money to spend on them (especially given high taxes) and the most benefit to derive from doing so.
- At the **second stage**, a country sees the beginnings of what can be called an IT industry: several large foreign software engineering firms enter, and at least several medium-sized local firms (of 100+ developers) appear and begin to use their origins as part of their identity (“We are a Kyrgyz developer.”) There might also be one or two product firms that develop their own offerings and compete in foreign markets under their own brand (though they will usually be registered somewhere abroad and book their profits there, too).
- At the **third stage**, several medium-sized outsourcing firms turn into dozens, multiple large firms appear as well (and themselves start outsourcing to other countries), and they are developing multiple original products (and many of them are locally registered and pay local taxes on their profits).

Any country would, of course, want to be at the third stage, for that is where the greatest value is captured. For now, though, the three leaders are slowly moving from stage one into stage two, Tajikistan is somewhere in the middle of stage one, and Turkmenistan is only getting started. Country-by-country, here is where things stand in terms of export-oriented IT (not to be confused with the domestically focused variety):

- **Kyrgyzstan** is probably the most developed of the three leaders in terms of export orientation. In services, it has one mid-size domestic outsourced development firm (Mad Devs); one more was recently acquired (TimelySoft, which has become part of Kanda Software); there used to be a third one also (Zensoft), but it closed in 2020. Several smaller firms are also present (we heard of Reviro, Attractor, and Unique Technologies). Of international firms, EPAM entered in 2021, and a mid-size company called iTechArt is also present. In products, the most successful companies are direct-to-consumer YouTube channels making English-language videos for young audiences: D Billions, much the most popular, has more than 20 million subscribers; another one called Tigi Boo has around two million. In what is thought of as more “traditional” IT products, Growave, which provides marketing for Shopify brands, is probably the best example (though it remains relatively small, with around \$1.3m in annual revenues in 2021).⁸
- **Kazakhstan** and **Uzbekistan** are ahead of Kyrgyzstan in terms of numbers but behind in some structural areas, of which the most important is that neither has the same numbers of homegrown, export focused developers as Kyrgyzstan (the biggest one we have heard of, Kazakhstan’s Akhter Studios, has about 40 developers; large domestic-focused companies like Kazakhstan’s Prime Source have reportedly been trying to get export business, but so far have only seen limited success).⁹

⁸ Appboxo, a company that helps mobile applications launch other apps from within, raised \$7m in Series A funding in 2022, and is frequently mentioned, but its main connection to Kyrgyzstan is that one of its founders is from there (the other is from Kazakhstan). The company is headquartered in Singapore, and of its more than 80 employees on LinkedIn, only around five are actually based in Kyrgyzstan. While its example serves as good motivator to ambitious founders, compared to companies like Mad Devs and Growave—which are locally based and employ the bulk of their workforce locally—its impact on the local ecosystem is limited. Some of the other export-oriented companies we heard of in Kyrgyzstan are NBFit (which exports fitness content and coaching to Russian speakers in Kyrgyzstan and abroad), Put In Byte (which works on, among other things, Amadeus-related automatization for the airline travel industry), and Fitjab (which creates fitness-related content for Muslim women).

⁹ It is important not to spend too much effort comparing the countries of Central Asia to one another: those differences matter less than the distance between them and the countries of Eastern Europe, which we discuss later in this section.

Large international companies, though, are present in both countries (EPAM entered Kazakhstan in 2008 through an acquisition and came to Uzbekistan in 2021; DataArt entered Kazakhstan in 2021 as well; Exadel entered Uzbekistan in 2020), and the product scene is more comparable to Kyrgyzstan, too. An Uzbek entrepreneur working abroad but running development operations from Uzbekistan saw product successes with kpi.com (an all-in-one business management platform) and zip24 (a SaaS startup focusing on e-commerce logistics); third-party revenue estimates are in the \$10-30m range for the former and \$5-10m for the latter. GreenWhite, another example from Uzbekistan, is a purely domestic company that also focuses on business management. It has grown at home and has begun expanding in the region and beyond (revenue estimates for it were not available). Some of the smaller companies we heard of are workly.io and billz, both part of the business automation space and both attempting to diversify into exports (though they still remain predominantly domestically-focused, at least for now). Kazakhstan's export-focused product companies tend to be export versions of domestic companies. Of the ones we heard of, pinemelon.com provides online grocery delivery in Denver based on the local experience of arbuz.kz; avtoelon.uz is a car sales marketplace in Uzbekistan that is based on kolesa.kz; Parqour is a parking management platform with about 250 parking lots, of which about a third are abroad; WebTotem provides website security. Claimed annual revenues for all four were in the low single-digit millions: the founders of Parqour estimated theirs at around \$2.5m for 2022, and third-party estimates of revenues for Pinemelon and WebTotem were under \$2m each.

- Tajikistan has yet to catch up with the three leading countries. Large international engineering companies are not present there, and the one local export-oriented company we encountered—Silk Road Professionals—employs about 30 developers. The product situation is somewhat better thanks to the work of Alif, a bank that expanded to Uzbekistan and is trying to build tech-centric Islamic finance offerings in countries like Pakistan and Bangladesh (though this is only possible because, typically for a stage one country, Alif has high enough margins to support paying for developers in an economy in which high taxes make it difficult to compete with exports). zypl.ai, which develops credit scores for financial institutions in data-poor environments, is the one company we heard of that is closer to a pure export-focused IT startup; the company is present in three Central Asian markets beyond Tajikistan, has global ambitions, but remains relatively small for now (the company raised \$1.1m in a pre-seed round at \$10m valuation in 2022).
- Turkmenistan only has domestic-focused development companies. One of the bigger ones, employing approximately one hundred development staff, has reportedly been considering working for foreign clients but—given Turkmenistan's lack of connection with foreign markets—has so far had trouble finding them. We did not come across any export-focused product success stories.

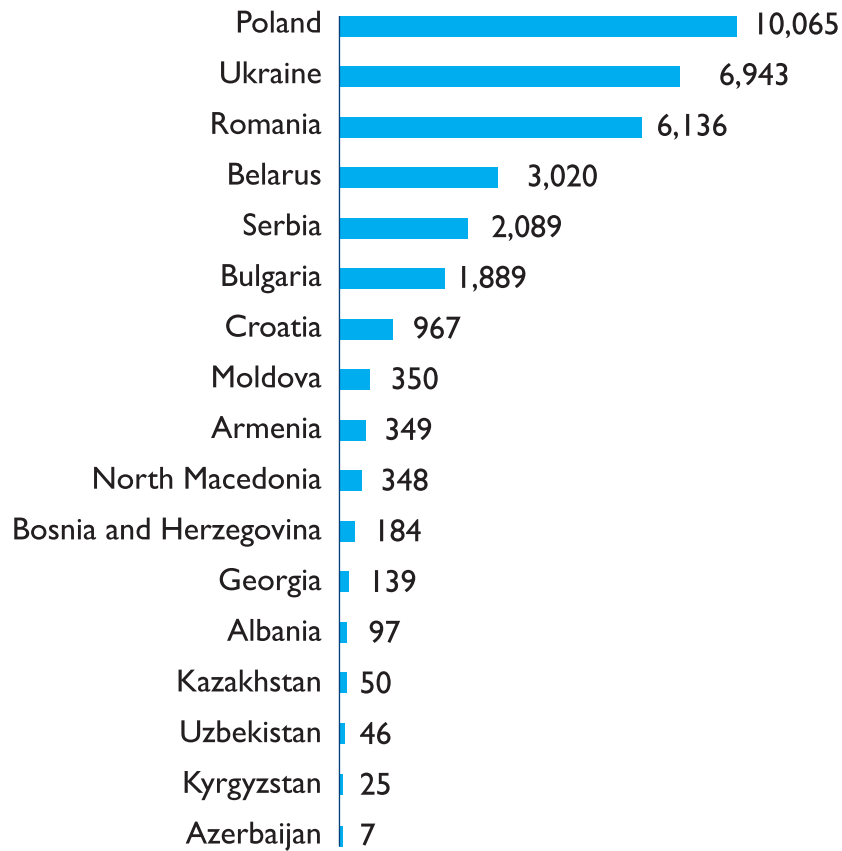
Putting the numbers in perspective: the growth goals and the gap between Central Asia and Eastern Europe

IT exports growth rates and increasing absolute volumes understandably give the three regional leaders some cause for celebration (especially in the case of Uzbekistan, where an IT export industry was hard to even imagine as recently as 2016, the last year before the current government took office). All three also have big ambitions: Kazakhstan is targeting \$500m in exports by 2025, Uzbekistan \$1bn by 2028, and Kyrgyzstan \$1bn by 2030; Kazakhstan and Uzbekistan are also putting millions of dollars a year into funding behind these endeavors.

That said, excessive excitement would be premature: compared to the leading countries of Eastern Europe, Kazakhstan, Kyrgyzstan, and Uzbekistan are where Ukraine, Moldova, and Belarus were in 2006-2007 (and where Poland, Romania, and Bulgaria were in early 2000s). The absolute figures look at least somewhat comparable (see chart: Computer services exports), but they mask reality, because Central Asian populations are larger than those of Eastern Europe.

Computer services exports

Millions of US dollars, 2021

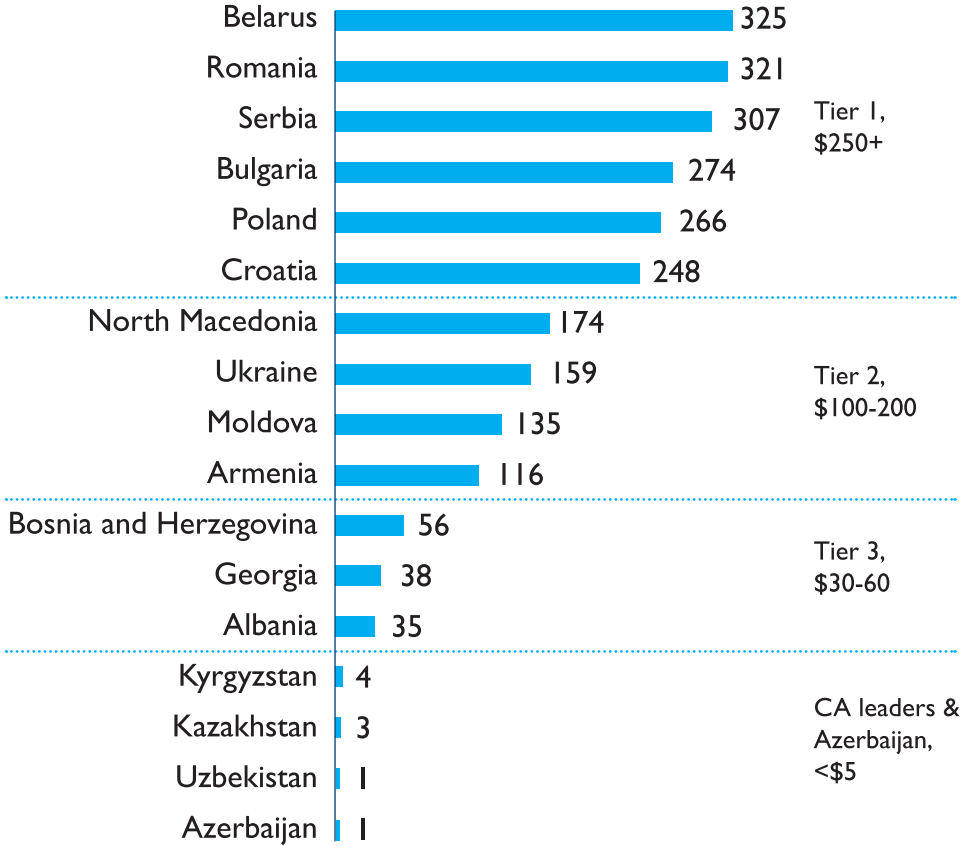


Source: Astana Hub, Uzbek IT Park, Kyrgyz High Technology Park.

Looking at exports on a per capita basis (never mind on a people-under-40 basis) gives a better idea of the gap (see charts: Per capita computer services exports; Historical per capita computer services exports). In the first tier of Eastern European IT exporters, Belarus, Romania, Serbia, Bulgaria, Poland, and Croatia all export above \$250 in computer services per capita per year (in descending order—though the numbers are based on 2021 data, and Belarus’s ability to remain on top of the list with its \$325 figure when data for 2022 comes out is very much in doubt considering the IT specialist exodus following the government’s crackdown on nationwide protests and Russia’s invasion of Ukraine). In the second tier, North Macedonia, Ukraine, Moldova, and Armenia (in that order) each export between \$100 and \$200 per capita. In the third tier, Bosnia, Georgia, and Albania each export between \$30 and \$60 per capita. The three Central Asian leaders, in comparison, are far, far below even that third tier: for now, none of them rise above \$5. Of all the Eastern European countries, only Azerbaijan posted a comparable performance, with official per capita computer services exports of under \$1 per capita.

Per capita computer services exports

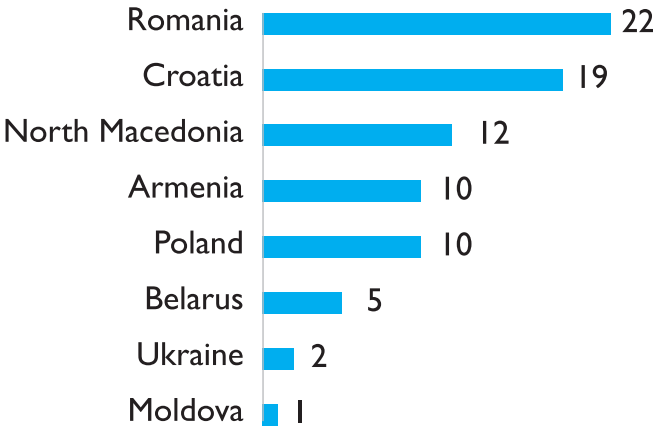
US dollars, 2021



UNCTAD; data for Romania, Poland, Croatia, and Georgia is estimated. Data for Kazakhstan, Uzbekistan, and Kyrgyzstan is from the countries' IT parks.

Historical per capita computer service exports

US dollars, 2006



UNCTAD; note that in the US, \$1 in 2006 had the same buying power as \$1.50 had in 2022 and \$1.31 had in 2021 (based on US CPI-U, Consumer Price Index for All Urban Consumers)

There are gaps in structural terms, too. All tier 1 and some tier 2 countries have well-developed ecosystems that include a) large outsourcing companies, both foreign and domestic, and b) several large product companies (many of them with \$1bn+ valuations, of which in 2021 Poland had 10, Ukraine 6, Belarus 4, and Romania, Bulgaria, and Croatia 2 each; see graphic: Startup ecosystems in Central and Eastern Europe). Only the tier 3 countries—Georgia, Bosnia, and Albania—are comparable to the Central Asian leaders in terms of where they stand, even though they still are ahead (in Georgia, for example, a startup called Pulsar had an eight-figure exit in 2021 and two more startups—one called Payze and the other called Theneo—joined the prestigious Y Combinator accelerator in 2021-2022).

Startup ecosystems in Central and Eastern Europe

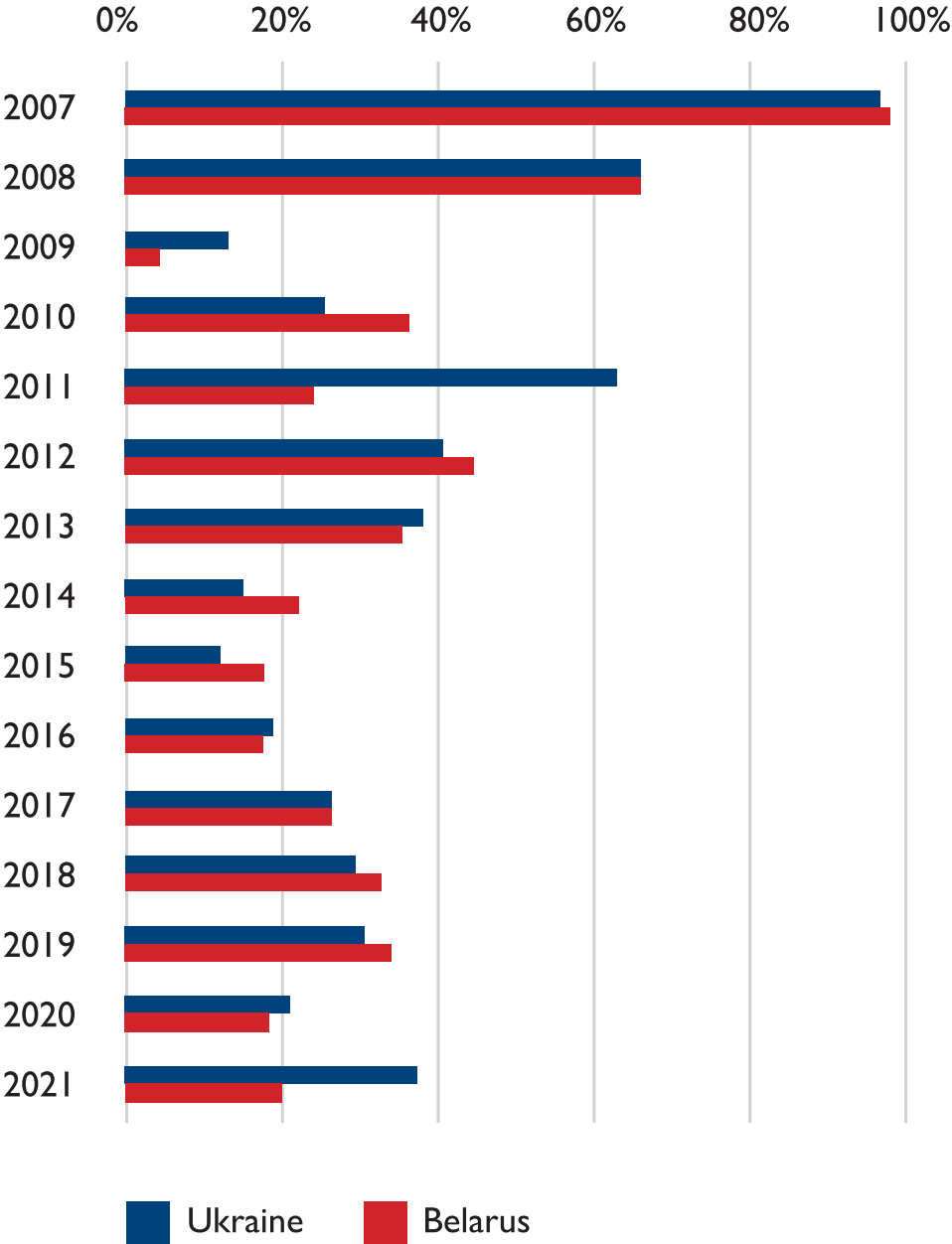


Source: Google for startups / atomico / dealroom

This does not mean that the countries of Central Asia cannot catch up. They can. Eastern European leaders started from low bases, too. But they started on this path two decades ago, and even if one assumes that greater demand for IT services, greater connectivity, and greater availability of knowledge would allow Central Asian leaders to cover the same distance in less time, if they compensate with focus and government resources for the advantages that, say, a country like Ukraine had from its Soviet technological base, it will still probably take at least a decade of a concerted effort for these countries to reach where Moldova or Armenia are today, in per capita terms (achieving Armenia’s 2021 levels of \$116 per capita would require \$2.2bn in exports in Kazakhstan, \$780m in Kyrgyzstan, and \$4.2bn in Uzbekistan). Whether the countries are going to be able to hit their own growth targets without diluting their definition of what constitutes “IT” is an open question, though: Kazakhstan’s target of \$500m in IT exports by 2025 implies 10x growth in four years (against a \$50m base in 2021); Kyrgyzstan’s \$1bn by 2030 implies 40x growth in nine years (against a \$25m base in 2021); Uzbekistan’s \$1bn by 2028 implies 22x growth in seven years (against a \$46m base in 2021). At least in Ukraine and Belarus, growth was slower: between 2006, when the two countries were at levels of per capita exports that are similar to where Kazakhstan, Kyrgyzstan, and Uzbekistan stand today (\$2 for Ukraine and \$5 for Belarus), and 2016, Ukraine grew 22x and Belarus 20x (starting from near-doubling in the first couple of years but quickly stabilizing to 20-40 percent annual growth rates thereafter; see chart: *Ukrainian and Belarusian year-on-year computer services export growth rates*). That said, even repeating the growth rates of Ukraine and Belarus and getting, by 2031, to \$1bn in exports for Kazakhstan and Uzbekistan and to \$500m for Kyrgyzstan would be an achievement well worthy of celebration.

Ukrainian and Belarusian year-on-year computer services export growth rates

From a per capita export base of \$2 (Ukraine) and \$5 (Belarus) in 2006 to \$159/325 in 2021



UNCTAD, computer services exports

GETTING TO A BILLION: STRATEGIES FOR GROWTH

IT exports are growing in Central Asia, but how to make sense of what is being done and what else could be done, whether by the government, the private sector, or NGOs? We look at the efforts of Kazakhstan, Kyrgyzstan, Uzbekistan, and Tajikistan and compare them with each other on a growth framework that includes laying the foundations, training developers, forcing growth upgrading, and feeding the growth that started. Because the situation in Turkmenistan differs from the other four countries, we consider it separately.

Improve the foundations

First, the foundations. A country that wants to grow needs to fix its Internet, teach English to large swathes of the population, maintain or build its reputation as a place with which one can do business, consider special IT taxation and special legal regimes, introduce visa-free stays for as many countries as possible, and work on the sorts of long-term fundamentals—basic ease of doing business, school education, and general quality of life—without which, long-term growth becomes difficult.

Fix the Internet

As far as the IT industry is concerned, the Internet in Kazakhstan and Kyrgyzstan appears to be adequate. One can always have higher speeds, lower costs, and better regional availability—but at least the people we interviewed did not think it presented a problem for their businesses. Several people we talked to in Uzbekistan did think that it was a problem; nearly everyone in Tajikistan did, as well. In both countries, the reasons appear to have to do with underinvestment by the state-owned monopolists that own the backbone infrastructure (in Tajikistan, the issue is also wrapped in the government's concern about Islamic radicals using the Internet to recruit followers). Tajikistan's situation is the worse one of the two: the fastest publicly advertised business broadband plan that we could find cost \$285 per month for a 6 Mbps connection,¹⁰ and although consumer plans were better—in Dushanbe, a maximum of 15 Mbps could be had for around \$60 a month¹¹—they were still expensive for how slow they were, giving pause to digital nomads in particular. Reliability is reportedly an issue, too. Connections in Uzbekistan are faster and more reasonably priced but have their limits as well: a business can get a 100 Mbps connection with the state monopoly Uztelecom for a \$90, but the maximum connection speed drops to 25 Mbps between 19:00 and 00:00, likely due to evening peak traffic constraints.¹² Actual speed drops might be even higher: we heard of a corporate player paying for a 1 Gbps connection that occasionally dropped to just 15 Mbps. Reliability and latency were mentioned as issues, too. Both Uzbekistan and Tajikistan would do well to solve their Internet problems: reliable Internet is one of the few absolute requirements for IT development and compared to the benefits to be had from such development, underinvesting in infrastructure and/or overcharging for access to it makes little sense to anyone but the monopolist. And where there are concerns about radicalization, strategies other than restricting Internet speeds and access can prove more effective.

¹⁰ See <http://toynet.tj/ru/internet-2>; the other providers either offered worse business plans (Babilon-T) or only had custom pricing (Megafon, SA Net).

¹¹ Based on offers from the provider Babilon-T; see <https://www.babilon-t.com/index.php/ru/cyberoptic?a=24>. Note that Internet speed rankings like Speedtest often show misleading results for Tajikistan because speed measurements are done on local servers and local speeds are much higher than international speeds.

¹² See <https://uztelecom.uz/ru/biznesu/internet/tarify-5/corporate-1-1/corporate-7-7> for the fastest corporate tariff. Consumers get a better deal: 1,000 Mbps connections are advertised for \$90 a month, with no formal time-of-day limit, for which see <https://uztelecom.uz/ru/chastnym-litsam/internet-1/tarify-4/yangi-2/yangi-1000-2>.

Fix the electricity

Electricity outages in the region are less of a problem for business than the state of the Internet (in the countries where the Internet is a problem), but they are a problem, nonetheless. Occasional power cuts happen even in the capitals; if they are short—3-4 hours—IT companies can rely on generators if they have them, but if they are longer—up to 24 hours, which does happen in all of the region’s countries—even having generators may not protect companies from losing Internet service when providers begin to go offline. A large company in Uzbekistan reported that a power cut made it reassign work to developers in other countries; a small company in Kyrgyzstan had to shift its deadlines and have its developers work late at night (and was relieved that its client was not interested in tracking its work too closely). Companies in Kazakhstan and Tajikistan likely have such stories to tell as well. For now, these sorts of problems will not destroy IT growth and—given the money to be made—will probably not dissuade foreign companies from coming. However, they do need to be fixed as the industry grows. How to fix them is well known: governments can invest in peak generation capacity, pay large customers to reduce their peak loads, upgrade the equipment most vulnerable to overheating, and connect particularly important customers to additional supply lines. The measures can be costly but are well worth it given the growth targets at stake (and governments can speed up their adoption if they tie utilities’ regulated profit levels to the average duration and frequency of their service interruptions).

Teach people English

English skills across the region are less than stellar—and one needs those for IT more than for most other industries. It is difficult to gauge the gravity of the problem,¹³ but it certainly seems fair to say that the vast majority of students who graduate from public schools do not have a command of English sufficient for working in IT unless their parents sent them to private English language centers or tutors (assuming they can afford it). One cannot quickly fix schooling issues across the vast public school systems in all four countries (although at least Uzbekistan is trying, with its English Speaking Nation initiative focusing on large-scale training of the country’s English teachers). But there are at least two short-term remedial options. One is to scale up center-based instruction, whether setting up large numbers of government-run centers for those interested in building their English skills or massively subsidizing enrollment in private centers for at least the low-income students (subject, of course, to quality control of the education that these students receive). The other option is to do something similar to what Georgia briefly attempted when a program called Teach and Learn with Georgia brought hundreds of foreign English-speaking volunteers into Georgian schools (especially rural and small-town ones), hosted them with local families, and put them in classrooms alongside English teachers as the teachers’ assistants. The cost per volunteer, a \$300/month stipend and roundtrip tickets to Georgia, was around \$4,000 per academic year, adding up to low single-digit millions for the impact of thousands of students meeting native speakers for the first time in their lives. Both options might be worth considering. “Coding,” an Uzbek entrepreneur told us, “is all fine and good. But it isn’t worth anything if the person can’t speak English.”

Simplify immigration

Immigration regimes across the region range from somewhat restrictive to very restrictive. US citizens, for example, need visas for both Uzbekistan and Tajikistan, while their visa-free stays in Kazakhstan and Kyrgyzstan are limited to 15 days and 60 days, respectively. Kazakhstan and Uzbekistan have launched special visas and residence permits for IT company employees. Still, although they are a big help for companies that already have in-country operations, they do nothing for clients or investors who are just thinking of coming—let alone for digital nomads or non-IT specialists (for instance, in Uzbekistan, getting permission to hire a non-IT specialist can cost more than \$1,000 in fees and take months, with approval

¹³ English First English Proficiency Index, compiled by the eponymous company, is one of the few attempts around to quantify country-by-country differences in English skills. All Central Asian countries score low, but we avoid using these results as the data behind them is not representative, as it is based on people who self-selected to take the EF test on their company website. Such an approach skews results. For example, Hungary fared better than Serbia in the 2022 edition, whereas the real-life situation is most certainly the opposite.

far from guaranteed). The digital nomad visa introduced in Kyrgyzstan in the summer of 2022 (allowing IT freelancers to stay for a year and granting them the right to work without a work permit) only applies to the citizens of Russia, Ukraine, Belarus, Kazakhstan, Armenia, Azerbaijan, and Moldova (for unclear reasons that may or may not have to do with Kyrgyz security agencies wanting to exchange information with any country they add to the digital nomad list).

From an IT development standpoint, all of this is overly restrictive. For export-oriented IT, the ideal migration regime probably looks something like Georgia's: citizens of around 90 countries are allowed to stay in the country for 360 days any time they cross the border and can set up companies and pay taxes without the need for any further registrations (including residence permits). Georgia, of course, is one of the very few countries with such liberal policies, and they, at any rate, may not last. But EU countries, for instance, allow US citizens to stay 90 days out of every 180, even if they require paperwork to stay beyond that—and all Central Asian countries are far from offering even those sorts of options to any visitors but those from the CIS. IT policy alone does not and cannot drive immigration policy. Still, as far as IT growth is concerned, all four countries would do well to consider updating their visa policies to at least 90 days out of 180 for the citizens of at least some non-CIS countries and simplifying their migration procedures for qualified specialists no matter what industry they work in.

Maintain country reputation

Country reputation—that is, whether someone who only knows about a country from the media thinks it is fine to do business with it—is acceptable, for now, for all four countries. As one of our interviewees put it, the rule for maintaining these reputations is simple: “Do not appear on CNN in the context of an armed conflict or violent suppression of peaceful protest.” The former disqualified Russia from the vast majority of OECD countries in 2022; the latter disqualified Belarus in 2021. In 2022, Kazakhstan came close to trouble with its violent protests and Kyrgyzstan and Tajikistan with their border clashes, but neither lasted long enough to have a serious impact. If any of the four countries' reputations ever decline, IT procurement managers in some industries will not work with that country's developers at all. Less scrupulous industries (oil and gas, for instance) will still hire developers but will want—and receive—a large discount for their troubles. National governments, of course, are not only thinking of their IT development when they decide whether or not to do something that will fail the CNN test. Still, they would do well to include the consequences for an industry that could become as large as some of their most valuable commodity exports when making that kind of calculation.

Consider special IT taxation

Kazakhstan, Kyrgyzstan, and Uzbekistan all have special IT taxation regimes through the Astana Hub, High Technology Park, and IT Park, respectively; Kyrgyzstan since 2011, Kazakhstan and Uzbekistan since 2018/2019. Tajikistan does not but is considering introducing one, perhaps in 2023. These regimes were set up to 1) draw some IT companies that were in the shadows into the open; 2) help some of those companies compete abroad thanks to lower costs; 3) attract some foreign companies to set up local operations, whereas before they might not have.¹⁴

Under all of these regimes, modeled broadly on Belarus's High Technologies Park, corporate taxes and VAT are 0 percent, and there is a 1 percent tax on revenues to support the operation of the IT parks (reduced to 0.5 percent in Uzbekistan for companies exporting more than \$20m a year). Existing differences have to do with income tax and social contributions: to pay a worker \$1,000 a month, a company—by our calculations—would need to spend \$1,264 in Kazakhstan, \$1,084 in Kyrgyzstan, and \$1,081 in Uzbekistan (not accounting for the 1 percent IT park fee; for details see table: *Required taxes and social contributions within special IT taxation regimes in Kazakhstan, Kyrgyzstan, and Uzbekistan*).

¹⁴The definition of what counts as IT varies by park is generally fairly broad, including software development (including gaming), cyber security, database services, BPO, and others. The Kyrgyz definition even allows graphic design and search engine optimization. See <https://adilet.zan.kz/eng/docs/V1900018523> for Astana Hub, http://http.kg/become_resident for Kyrgyz HTP, and <https://it-park.uz/en/itpark/residents/requirements> for Uzbek IT Park.

Required taxes and social contributions within special IT taxation regimes in Kazakhstan, Kyrgyzstan, and Uzbekistan

COUNTRY	Required taxes and social contributions (includes both those paid by companies and those paid by workers)
Kazakhstan	<ul style="list-style-type: none"> • 10 percent pension contribution (up to \$672/month max) • 2 percent health insurance contribution (up to \$25/month) • 3.5 percent social contribution • 9.5 percent social tax (up to \$30/month) • 3 percent health insurance tax (up to \$36/month)
Kyrgyzstan	<ul style="list-style-type: none"> • 5 percent income tax • Fixed social tax payment of ~\$30/month
Uzbekistan	<ul style="list-style-type: none"> • 7.5 percent income tax

Whether Kazakhstan’s higher taxation levels will make a material difference to growth remains to be seen. For now, the difference does not seem to matter much—or at least, it did not matter much (or come up in any of our conversations) while the market was rising and developers were scarce. The Kazakhstan regime is scheduled to last until 2029, Uzbekistan’s until 2028, and Kyrgyzstan’s until 2026 (though a 15-year extension is already being considered).

All in all, the regimes seem to be doing what they were designed to do: companies that were previously in the shadows due to high taxation on gross salaries (as high as 50 percent) came out into the open (though some, of course, still avoid paying taxes), new foreign players came in, and hopefully—in time—at least some local players will use their tax advantages to compete abroad. Tajikistan will likely have to follow suit to remain regionally competitive, though it still is not clear just what the Tajik taxation regime, if and when it is passed, is going to include. Potential problems for everyone with these regimes may include the discontent among those who do not receive the privilege (“Why IT and not manufacturing?”) and OECD members’ attempts to limit such regimes through the OECD Harmful Tax Practices Forum. Compared to both of these, the boost to growth seems worth it, at least for now.

Consider a special legal regime

Kazakhstan, alone so far among the four countries, has set up a special legal regime that IT companies can use if they want to: if they register with the Astana International Financial Center (AIFC), they can choose to be under the jurisdiction not of the country’s regular legal system but of the AIFC Court, which works with English law and is staffed with English judges. It is too early to tell whether the regime is having an effect, but it might convince at least some investors to shift their risk-reward calculation in favor of entering Kazakhstan.

The other three countries do not yet have a similar regime. To be fair, they do not need one for basic IT outsourcing. In Kyrgyzstan and Uzbekistan, the governments have set up clear enough rules for company operations inside IT parks, which means that bringing enough money into these countries to pay salaries is a risk foreign companies are mostly willing to take (risks are perceived to be higher in Tajikistan, although a few IT businesses have been able to work without government interference). Registering product companies is another matter: someone building a product company told us there is “absolutely no way” her investors would allow her to register her company anywhere in the region. Governments may try to imitate Kazakhstan’s special legal regime to see if that is going to get more companies to book

their profits locally. That said, those governments—and Kazakhstan’s, too—would do well to try and build, at least over the medium term, the investors’—and everyone else’s—favorite legal system, which has no need for special regimes at all.

Work on the long-term fundamentals

Basic business operations, school education, and citizen quality of life are three areas that the four countries need to improve if they are serious not just about quick IT growth from a low base (which can be ignited by working on the Internet, English skills, country reputation, special tax and legal regimes, and visas) but also about long-term growth. All of these are complex enough that each could take up a large report of its own, but we will nonetheless go over them at least quickly.

Basic business operations—registering companies, paying taxes, hiring and firing workers, getting paid from abroad, and so on—are an issue in all four countries (or rather, since these can be an issue in any country, it would be more accurate to say that many of the people with whom we spoke thought that they are rather more of an issue than in the average OECD country). Kazakhstan, Kyrgyzstan, and Uzbekistan made great strides in recent years—but there is much more to be done, and their work should continue. Tajikistan has more catching-up to do, mainly in terms of the role of informality. IT park regimes introduced by the three leaders and which Tajikistan is now considering only help so much: they do streamline some of these operations, but if IT grows, it will eventually expand beyond any definition of these regimes that does not include the entire economy—and so it is the entire economy that should eventually benefit from the same kinds of ease-of-doing-business improvements that special regimes provide.¹⁵

The picture of **school education** in all four countries seemed average at best. Some countries—Kazakhstan in particular—were trying to improve. Still, the impression of those we talked to seemed to be, “although there are one or two good public schools in the capitals, middle-class and wealthier parents rely heavily on private schools of all stripes if they want a good education for their children.” And the results are at most average: Kazakhstan, the only country in the region that participates in international school assessment programs, was near the middle in TIMSS (which looks at mathematics and science) but near the bottom in OECD’s PISA (which, in addition to mathematics and science, also looks at reading skills).¹⁶ We have no reason to think that the other three countries are faring any better. Quality issues are also more pronounced in rural and small town schools—and given the scale of at least the three leaders’ IT ambitions (and, presumably, those of Tajikistan if and when it joins them), it will be impossible to educate the kind of workforce they need without relying on the graduates of these schools, at least to a certain degree. There is no way around it: IT is a knowledge industry, and it will not develop at scale without high-quality primary and secondary schooling.

Finally, **citizen quality of life**—how citizens feel about their housing, parks, entertainment, environment, schooling options for their children, medical care, and so on—is, at best, average across the region. Some of the people we talked to liked the environment where they lived (especially if they appreciated having access to nature); some were neutral about it. Yet there was a sizable number of those who thought that the region is far enough behind even Eastern Europe (let alone Western Europe or the US) that they would, in time, consider moving. As one of our interviewees put it, “It’s nice to make all this money, but where am I going to spend it?”

Changing such perceptions and the realities from which they derive is (mostly) complex and expensive, but not changing them is not an option: no matter how attractive the tax regimes may be, too many people who could be building new companies would simply use the money that they are making to buy themselves something that they could not buy at home, which is to say, a comfortable urban life.

¹⁵ Not even special regimes can address the issues that IT businesses—especially smaller ones—have when it comes to getting paid from abroad. Of all of the countries of the region, PayPal (which some clients prefer to use because it provides them with a degree of protection) only works for businesses in Kazakhstan; businesses in other countries need to use intermediary services like Payoneer, increasing their costs and complexity. We have heard, too, of issues with receiving payments to regular bank accounts, including lost payments and delays.

¹⁶ For TIMSS, see <https://www.iea.nl/sites/default/files/2020-12/TIMSS%202019-International-Results-in-Mathematics-and-Science.pdf>; for PISA, <https://www.oecd.org/pisa/publications/pisa-2018-results.htm>

TURKMENISTAN: PRECONDITIONS FOR IT GROWTH

It is much more difficult to run an export-oriented IT business in Turkmenistan than anywhere else in the region. For this reason, the country does not have much, if any, formal export-oriented IT (though some freelancers are likely working informally). For that to change and for the country's official IT exports to begin to grow, Turkmenistan's government would have to address three fundamental areas for at least the export-oriented IT industry: currency control, Internet, and migration.

Currency control makes foreign IT companies uninterested in coming to Turkmenistan and makes it difficult for local export-focused companies to emerge. Because of currency control, any company that exports IT needs to be running a different parallel business, at the same time. Turkmenistan has two exchange rates for the manat: an official one of 3.5 manat to the USD and an unofficial one, which fluctuates but which was around 18 manat throughout 2022. Individuals who get currency from abroad can withdraw it and sell it at the unofficial rate. Companies that get currency from abroad have to use the official rate, which means that if someone wanted to set up an export-oriented IT company in Turkmenistan and hire developers who are used to making—say—\$1,000 a month as freelancers, they would have to bring, per developer, more than \$5,000 into the country, sell it officially, and then pay their developers the manat equivalent of \$1,000 on the unofficial market. This ensures that no pure IT-exporting company can even exist: nobody can sell Turkmen developer services at five times the market price and still make money. There are ways around it, which is where running a parallel business comes in. The first way is to use foreign currency earnings to buy goods abroad (computers, for example), bring them into the country, sell them for manats at whatever they are worth at the unofficial rate, and use the proceeds to pay the developers. The second way is to never bring foreign currency into the country at all and run another domestic business—IT or something else—so as to earn manats with which to pay one's developers. Foreign companies are obviously not interested in either workaround: why bother when lots of countries offer developers who cost just as little, and you don't need any workarounds to get things done? Local companies may try to use the workarounds, but then they would have to be good not just at one business—IT exports—but two (and working in domestic IT does not count as the same business: what Turkmen companies want in IT is very different from what, say, American companies want in IT). This obviously limits the possibilities for IT growth further than the lack of foreign companies does: entrepreneurs that are good at one business are rare, but those that are good at two are rarer still. Freelancers who in other countries might try to set up their companies might decide that it is better not to bother and choose instead to earn their \$2,000 a month without the trouble of running two businesses. For export-oriented IT to have a chance of growing—whether thanks to foreign companies or to local ones—currency controls would have to be adjusted in order to make it possible to run IT-exporting businesses without running any other businesses in parallel (Belarus, which lifted currency controls for IT business while maintaining them for other parts of the economy, might serve as an example here).

The state of the Internet, the second area that would need to be improved, makes running an IT business more expensive yet (and makes it difficult to meet foreign clients' expectations, too). In Turkmenistan, a global-standard 100 Mbps connection—the fastest publicly advertised—would cost a company \$35,700 per month at the official exchange rates; a barely-acceptable 20 Mbps, \$7,500.¹⁷ Even if a company uses one of the currency control workarounds, that is still \$7,000 a month and \$1,500 a month at unofficial rates, respectively. In Uzbekistan, the same 100 Mbps connection costs \$90 (even if it does turn into a 25 Mbps connection during evening peak hours). IT is a globally competitive business; a

¹⁷ See <https://telecom.tm/en/tarif-gov/>

company could not pay Internet bills this high and still manage to compete—with Uzbekistan, or anyone else. Access is an issue, too: Zoom, the corporate standard for video communications, does not work, for instance. And then there are the consumer restrictions and slow speeds that affect the IT industry less directly. A particular IT business may still use client VPNs even if most consumer VPNs are blocked, and official exports would not be happening over consumer connections that top out at 2 Mbps—but IT growth will still suffer because consumer problems a) make it more difficult for IT freelancers to do export work (and it is freelancers who often go on to found formal businesses once they have enough clients to work with) and b) make it difficult for people to teach themselves programming (and in IT, self-education is as important, if not more important, than formal instruction). For IT growth to take off, Internet cost and access would have to dramatically improve at least for the IT companies—and for further growth, consumer access and speeds (and, presumably, regional availability) would have to be improved as well.

The third and final area that would need to be addressed is Turkmenistan's migration policy: the current policy makes it difficult to visit the country in general and nearly impossible to do so on short notice. The citizens of any country—CIS countries included—need a visa to enter Turkmenistan, and although it may be possible to get a visa on arrival at the Ashgabat airport, this requires having a letter of invitation either from a tourist agency organizing the trip or from whomever is inviting the foreign citizen to visit. The need for a letter is a barrier that a foreign businessperson might put up with if there is money to be made—but the letter also needs to be submitted to Turkmenistan's migration authorities or consular offices in advance (reportedly with at least two weeks' notice), which makes the short notice visits necessary in almost all areas of business nearly impossible. Visa policy is less important to IT growth than currency controls and the state of the Internet—basic outsourcing might be viable if only those two are addressed—but longer-term growth most certainly requires simplifying migration, at least for the companies connected to the country's IT sector.

The changes outlined above would, of course, work best if applied across the board. But even if applied only to IT exporting companies—within, perhaps, an IT park built on the model of Turkmenistan's neighbors—they would have an immediate short-term effect, attracting foreign companies interested in a new pool of low-cost developers and getting at least some freelancers to start IT-exporting companies based on their existing client connections. Down the road, the prize to be had would be quite large: if, within a 10-15-year horizon, Turkmenistan were to reach Armenia's levels of per capita IT exports (\$116 per year in 2021), it could bring in more than \$700m in export earnings, while getting to the levels of Belarus (\$325 in 2021) would bring the amount to nearly \$2bn. That is still not as much as Turkmenistan gets from its gas exports (\$5.3bn in 2020)—but even the Armenian level revenues would be almost three times greater than Turkmenistan's largest non-fossil fuel export of cotton and textiles, which stood at around \$240m in 2020.¹⁸ Without any changes, some growth might still occur—one or two local IT companies are reportedly trying to find foreign clients—but it would likely remain far below the potential of a country with 4.3m people under the age of 40.

¹⁸ Export data: Observatory of Economic Complexity

Bring in developers

Second, the developers: masses of junior professionals from short-term intensive training programs and smaller numbers of university graduates (with a focus on fundamental knowledge)—while being mindful of the need to have enough seniors and leads to train the juniors on the job and organize their work.

Train masses of junior developers

All four countries are training junior developers in bootcamps, which is to say, 6-12-month intensive training programs that take in complete beginners. Bootcamps are both for-profit and non-profit, and students usually pay around \$1,500 per course. Government institutions do not usually train students directly, but one government intervention includes paying for some of the students: Kazakhstan is doing this through its Tech Orda program, which gives private IT schools vouchers of about \$1,200 per student (it targets about 3,000 people a year and hopes to reach about 20,000 total in the next five years). The program is just starting, but it will certainly produce some additional developers (though perhaps the entire 20,000 will not be incremental: some would have gotten an IT education anyway). The other intervention involves paying for online classes: Uzbekistan is doing this through its One Million Uzbek Coders program (modeled after the One Million Arab Coders one). This program lets Uzbek citizens take free online Uzbek-language classes through a platform called Udacity: that is not enough to produce actual job-ready developers, but it at least shows large numbers of people that they could become developers and teaches them, at a very basic level, what that could be like. There are also private interventions: some large companies train junior developers for free and hire the very brightest students afterward.

All three interventions attempt to fix the biggest problem with a privately run, loosely regulated IT education market: it may not produce enough developers because not enough people can afford to pay a sizable amount of money upfront for a chance—not a guarantee—of a job down the road.¹⁹ Kazakhstan is attempting to address another problem, too, through the way it manages its funding program: to make it less likely that a private IT school takes government money but does not teach its students what they need in order to get a job, the Tech Orda program is planning to monitor whether a school's graduates do in fact get jobs—and if they do not, the school will no longer receive government vouchers. There have also been proposals in Kyrgyzstan to set up a certification program for IT schools—essentially along the lines of a standard post-graduation test to see who has learned what—but they have not been funded and plans are currently shelved. All four countries would do well to build on and expand on the three interventions—government subsidies, quality controls, and company-led training—while learning from each other to see what works and what does not.²⁰

Be mindful of the senior/lead developer bottleneck

Senior/lead developers that can train junior developers on the job are a bottleneck across the region (they are, to be fair, a bottleneck everywhere, but much of everywhere is facing the bottleneck with higher export numbers). The only way a country can address it is to try and get seniors from somewhere else—but that is rarely possible at scale (except for extraordinary circumstances like the Russian invasion of Ukraine, although even in that case there are questions about how long the Russian arrivals will remain in Central Asia before

¹⁹ This problem is potentially a serious one. Making the math work behind \$1bn export goals requires training approximately seven to ten thousand developers a year in each country, and it is not clear that it is happening. The exact numbers are unknown, but some of the people we talked to felt that the output of reasonable quality junior developers falls well short of that in all four countries. For an example of the scale of the challenge at hand, consider Kyrgyzstan: the country has between two and five thousand export-focused developers (depending on whom you ask). To reach a billion in exports, it needs 25,000 (assuming the same \$40,000 in exports per developer that Ukraine and Belarus are at now, or a roughly \$2,300 gross salary per month after 30 percent expenses). To have 25,000, Kyrgyzstan probably needs to train 50,000 (some will leave the field voluntarily, and there will always be some who are not good enough to find jobs). This means that if the country wants to reach one billion in IT exports in eight years—by 2030—it needs to train more than 6,500 developers a year. The sense we got is that at most a third of that amount is currently being trained, half in universities and half elsewhere.

²⁰ Governments could subsidize company-led training, too—as long as the training focuses to a significant extent on skills that are not specific to the company providing the training.

²¹ We also heard of problems with remotely hiring senior developers, at least in Kazakhstan: it is apparently possible to hire them remotely—have them sign their work papers without physically coming to Kazakhstan—but it is not possible to pay them to a remote bank account in anything other than Kazakh tenge, which, of course, is not terribly useful for someone in the Philippines. The developer would be required to come to Kazakhstan in person, open their local bank account, and then go back to their country, which makes the remote hiring process that much more difficult.

moving on).²¹ Barring that, no matter how many junior developers there are, a single company's growth would be limited to approximately 30 percent regardless of demand for its services, because senior developers can only train so many junior colleagues.

This is because there are only so many senior/lead developers working within companies, not all of them are interested in taking on junior mentees, and each one that is interested can only take on so many juniors per year. This mentorship is also a necessary part of training for developers: a bootcamp can teach coding, but it cannot teach how to work with clients or within a particular company's culture and processes. Training is a big investment for companies, too. Before they can begin to sell a developer's services, they need to train them for at least a year (and pay them for the duration). Senior developers also need to spend time on them that is not billed to the client. Between the time that a junior developer out of a bootcamp joins a company and the time that the company is able to profit from their work, the company may well have spent \$40,000-50,000; after that, it will be another 2-3 years before the investment pays off (assuming that the developer does not drop out of the profession or move to another company before that). Of course, an investment that pays for itself, even within five years, is still a good investment in most businesses—but one can see why companies would be limited in how many junior developers they want to take on, even when the market is on the upswing (let alone when it is not, in which case companies will probably only want to train enough people to replace employees who have left). Those who design initiatives to expand the supply of junior developers would do well to keep the senior/lead constraint in mind: otherwise, they will end up growing overqualified unemployment.

Improve formal IT education

We do not know how well universities in the region are training advanced level IT specialists. That is a matter for another report. That said, just like with school education, our impression is that little extraordinary is taking place. There are universities, and they do produce IT specialists numbering in the high hundreds or low thousands every year, depending on the country. But none of them are operating at a level one could call globally competitive—or even anything approaching that. There are individual (mostly private) institutions in the three leading countries trying to change this situation (and EPAM is even setting up a university in partnership with the Uzbek government). It will be a while before this work bears its fruit, but it is needed: a country does not really need university-based IT education to train developers for outsourcing, but it does need them if it wants to move to the next level.

It may be important to mention that both in Belarus and Ukraine, major changes took place when practitioners started to teach in universities en masse because both companies and universities began to expect this. The process can take many years—it takes a long time for dozens of companies to figure out how to work with dozens of universities—but it does need to happen, and the sooner companies, universities, and government are able to work to make it a reality, the better. All involved would do well to guard against an excessively practical focus, however. Some IT companies will push for this, but universities should be places that provide their students with both the in-demand skills of the moment and also the foundations that will prepare them for long and productive careers in an industry that changes very quickly.

Force an upgrade

Third, upgrades: a focus on exports (ideally financial in nature), large foreign companies, local companies' export-oriented business skills, and support for export-oriented product startups through mentoring, angel funding, and VCs.

Tie financial incentives to exports

Kyrgyzstan has an export requirement for its IT park: in order for a company to join, 80 percent of its revenue must be from exports. Kazakhstan and Uzbekistan do not have such requirements. They may want to consider introducing them (Astana Hub reportedly is, though only by about 2030), and Tajikistan may do the

²² The focus on IT development started earlier, too—Kyrgyz HTP was founded in 2011—and the IT park, uniquely in Central Asia, was a bottom-up organization rather than a top-down one.

same, if and when it sets up its own IT park regime. Why? Because exports are hard. It is hard to sell to people who are different from us. It is true that a company can make more money from exports, but if a country is large—like Uzbekistan—or large and relatively wealthy—like Kazakhstan—a lot of its IT companies will remain domestic (and in both countries, they did—unlike in Kyrgyzstan, which is neither large nor wealthy, for which reason at least some of its companies focused on exports from the very beginning).²² That is fine for those companies if that is what they want, but what is the purpose of special tax regimes? Is the goal simply to bring IT companies out of the shadows and into the formal economy? If yes, that is perfectly fine. But if the idea is to also grow IT exports—and we have already discussed why it makes sense for economies that depend mostly on commodity exports—tying these regimes to export volumes will likely push faster export growth for the simple reason that companies will follow profits and learn how to do something that they do not know more quickly if there are profits to be made (or if they are able to lower their taxes, which is essentially the same). Granted, Kazakhstan and Uzbekistan did not really have a lot of export-oriented IT when they set up their IT parks—“Our park would have been empty if we’d had started with export requirements,” one interviewee reported—but as exports begin to grow, it might make sense to tie IT park benefits to export performance, at least to a certain (perhaps sliding) extent.

Bring in large foreign software engineering companies

Of the large foreign software engineering companies, Kazakhstan has EPAM and DataArt; Uzbekistan has EPAM and Exadel; Kyrgyzstan has EPAM. Several mid-range companies are also present (Kanda Software and iTechArt in Kyrgyzstan; iTransition in Uzbekistan). Tajikistan has yet to attract any. These all entered in the last few years (with the exception of EPAM in Kazakhstan, which market the company entered through a 2008 acquisition that was not focused on software development); when they entered, they immediately brought in thousands of well-paying jobs in which they trained developers to Western standards and began promoting Central Asia to their clients. Attracting these companies required lots of high-level effort; this task will become easier for future companies, as the presence of earlier arrivals will act as a sort of guarantee. Some efforts will still be necessary, however. Kazakhstan, Kyrgyzstan, and Uzbekistan would do well to continue attracting more of these companies; Tajikistan would do well to attract its first companies if and when it decides to accelerate its IT development.

Build local IT companies’ export-oriented business skills

Some of the people we talked to reported that although their countries need to train large numbers of junior developers (while being mindful of the lead/senior constraint), an even bigger challenge is the lack of businesspeople around to employ them. Large foreign companies may of course soak them up to some extent. But these companies cannot be a silver bullet: if a country thinks about its long-term development, it also needs to think about nurturing local companies—or, to be more precise, the kind of companies for which the country is one of their main bases of operations (such companies tend to be local, though this is not necessarily the case. For simplicity’s sake, we will refer to them as local). A large international company quickly brings in foreign clients and foreign standards—but it can also leave abruptly, especially in a crisis situation. It is much harder for a local company to leave (except in exceptional cases similar to what happened in Russia following its invasion of Ukraine). For this reason, a country would do well to have several reliable local companies (and hope that, perhaps, they might eventually outgrow their local markets and follow in the footsteps of large foreign players by setting up operations elsewhere). This, however, begs the question: where do we find the people to lead these companies and to sell their local IT products and services to foreign markets?

There is no simple answer. One can teach basic development in six months. This is a technical skill. It is harder to teach export-oriented business skills: that is something best learned by doing—or rather, by doing it among those to whom one wants to sell. There are two options here: either Central Asian countries can import the manpower they do not have (be it foreigners or locals who spent a long time abroad); or alternatively, they can train them. If these countries plan on importing workers, they should strive to draw locals back home or attract foreigners rather than simply hope that they will come (and visa policy changes play a key role here when it comes to foreign workers). If they prefer to train their own workers, countries might opt to send

them abroad for extended periods (and then work to bring them back), or they can try to train them locally, to a basic, minimum level (one Uzbek entrepreneur talked to us about setting up a half-year course in the business of software development). All of these things are happening to some extent—but not nearly to the degree that Central Asian countries need in order to reach and surpass their export growth targets. All four countries would do well to systematically try and build export-oriented business skills.

Support export-oriented product startups

To varying degrees, Kazakhstan, Kyrgyzstan, and Uzbekistan all have the foundations of startup mentoring and networking support (whether they call it accelerators, incubators, or something else; these terms mean different things in different places). Kazakhstan's Astana Hub also offers approximately \$50,000 of seed funding per startup. We do not know how successful these programs will be at achieving their goal of creating a pipeline of startups large enough that at least a few companies could become successful; that will become clear in time. That said, there are two issues of note related to funding. The first is the apparent lack of angel investors across Central Asia. Angels give entrepreneurs their initial capital, usually between \$10,000 to \$50,000. People in Central Asia who have that kind of money to spend are not used to getting a few percent of a likely-to-fail startup in exchange for it. They are used to receiving much, much more (and to their chances of success being far better as well). Angels may appear in due time, but in order to speed that process up, governments and NGOs can work to educate people with money about what it means to be an angel investor: what share angel investments may represent in one's portfolio, how many such investments to target, how to define the kinds of investment thresholds with which one is comfortable, and how investing in early-stage companies gives far more opportunities to work with promising entrepreneurs at a stage in which they are most receptive to help and advice than investments in other asset classes.²³ The second issue is related to VC funding, though this has more to do with the future than the present. There are some VC operators across the region—Most Ventures in Kazakhstan is one; in Uzbekistan, there is the government-run UzVC and the private Semurg.vc; and in Tajikistan and Kyrgyzstan, there is Accelerate Prosperity (this is not a pure tech VC fund, but rather an initiative of the Aga Khan Development Network that works with development donors and focuses on many industries. It does invest in tech startups, especially in Kyrgyzstan); finally there are foreign-based TUZ Ventures and Sturgeon Capital, which invest across the region, as well. Given the current low numbers of truly fundable export-focused startups, these initiatives are probably sufficient for the present (though we heard of one company that needed funding in the low millions and was too large for local VCs, but too Central Asian for VCs beyond the region). If and when the number of fundable startups begins to significantly expand, there may come a point when the governments could consider playing a more active role than they currently do, potentially based on the model of Israel's successful Yozma co-investment program from the 1990s, in which the government co-invested 40 percent with private funds but kept its upside limited to a fixed annual interest (which ensured that if an investment worked, private investors could increase their returns nearly 1.5-fold for free).²⁴ The conditions in Central Asia are not the same as in Israel in the 1990s: at this time, there is no massive demand for capital. However, the mechanism is worth considering and perhaps trying on a scale that is appropriate to the number of existing fundable ideas, or perhaps even double that.

²³ Most of this work would have to take place locally, but it is important to target the diaspora, too. Diaspora connections are sometimes even more important than the money they can provide (although the money, of course, helps as well). In Georgia, for example, the one and only exit so far—Pulsar AI, a company automating customer service for auto retail—happened largely because a diaspora entrepreneur invested in the company and also gave it access to a large data set from one of his businesses on which they could train their algorithms.

²⁴ For an investment of \$1m, the investor would bring \$600,000 and the government would contribute another \$400,000. The investor then had the option of buying the government out from the deal within five years at cost (plus interest), which meant that if the deal went bad, the investor did not owe the government anything, and if it took off—let's say it grew 50 percent in a year—they would capture the upside not just on their \$600,000 but also on the government's \$400,000. On the \$1m deal, the investor's upside would be around 80 percent rather than 50 percent (\$300,000 that they earned on their \$600,000 invested, plus the government's \$200,000, minus the interest). There were, of course, other details to it. The program had ambitious aims: \$100m of government funds were meant to bring in \$150m of private investment, for a total of \$250m. It created competition: the government wanted the money to go to at least 10 different funds. It drew global expertise: investors had to bring in reputable foreign VCs as partners. It also came at the right moment: there was high demand for capital in the Israeli tech scene and the supply was low. And it built on a less successful program, Inbal, which attempted to insure investors' downside, did not achieve much in terms of industry growth, but at least showed the government what would not work and why. For more details, see Gil Avnimelech, VC Policy: Yozma Program 15-Year Perspective.

Feed growth

Finally, feeding growth: having a single entity in charge of it, developing a written strategy with community input, working with local IT associations, growing a multitude of community organizations, attracting digital nomads, and building a country's image as an IT service provider.

Have a single government entity to drive IT development

Kazakhstan, Kyrgyzstan, and Uzbekistan all drive their IT development from within their IT parks. The Kazakh and Uzbek operations are well-funded—with annual budgets in the single-digit millions—and are run as de facto departments of the ministries responsible for all things digital (the Ministry of Digital Development, Innovation, and Aerospace Industry in Kazakhstan and the Ministry for Development of Information Technologies and Communications in Uzbekistan). In addition to administering their countries' special tax regimes, they offer physical campuses and even (especially in the case of the Uzbek IT Park) provide extensive handholding to interested investors, from meeting them at the airport to helping them register their companies. The Kyrgyz setup is different: it is more independent (the HTP is run by a supervisory board to which parliament, the prime minister, and the country's developer association each appoint three members) and also receives far less funding, running only on the 1 percent of revenue fee paid by IT park members (which amounted to \$250,000 in 2021 and will be approximately \$400,000 in 2022). The HTP's independence appears to serve it well in a country in which governments change frequently, but the lack of funding is naturally a liability (and the main reason why its activities focus mainly on administering the special tax regime and advocacy, without any of the extras available in Kazakhstan and Uzbekistan). Tajikistan does not have a single entity responsible for IT development.

Tajikistan would do well to set up a single entity if and when it decides to develop its IT industry, be it an IT park or something else. Kyrgyzstan would do well to consider funding its IT park beyond the basic level at which it is currently funded, be it from government sources, industry, or donors (if funding comes from the government, it can still allow the park to remain independent, which seems to serve it well in a country in which cabinets change frequently). Kazakhstan and Uzbekistan would do well to stay the course: to paraphrase Henry Kissinger, one should always know whom to call if one wants to call Central Asian IT (there is, though, a caveat about the top-down nature of the two setups that we will discuss below).

Develop a written IT growth strategy with community input

The three countries with IT parks all have their own internal strategy documents. However, they do not seem to have an externally facing strategy that they developed with heavy input from the IT community. IT development can still be a reality without one, but it will probably happen more quickly with such a strategy. This is because the process necessary to create a written strategy will also mean that companies, NGOs, and government officials will 1) believe that the goals of the strategy are achievable, even if they are also ambitious; 2) expand their understanding of what they can do to achieve those goals; 3) understand what they all are going to actually do; 4) believe that others will do whatever it takes alongside them. For the next—or perhaps first—iteration of their strategy efforts, entities responsible for IT development would do well to run processes like that, with final well-produced documents to match.

Support local IT associations

If one finds whom to call when they need to speak to IT, whom do they need to call to speak to the community? In Kyrgyzstan, there is KSSDA (Kyrgyz Software and Service Developer Association, often referred to as KARPOU, its acronym in Russian) which has been around for years and has done much to help the IT industry receive the benefits it enjoys today (even if it is understaffed and underfunded, which that same industry should probably try to fix). In Kazakhstan, Uzbekistan, and Tajikistan, there is nothing comparable. In Tajikistan, the loss is not yet large as growth is only just beginning; in Kazakhstan and Uzbekistan, the stakes are higher: when the two IT parks make large decisions about what direction to take, they do talk to individual players in the IT industry, but they do not engage the IT community

as a community, because currently, no such community exists (beyond, of course, the kinds of informal conversations that happen in any industry). IT development can certainly proceed without creating any IT associations, but it is safe to say that these associations strengthen the entire industry: no matter how qualified an IT park may be, its decisions will always improve—and will certainly be more widely accepted—if they are discussed and challenged in group settings rather than individually (all the more so if the group settings balance the interests of different kinds of members—large versus small, for instance. Those who set up future associations would do well to keep this in mind).

Grow a multitude of community organizations

All four countries have individual IT-related community organizations, but there do not appear enough of them at this time to begin adding up to an ecosystem. Companies like Kyrgyzstan's ololo Creative Hub, Uzbekistan's IMPACT.T Tech Hub, or the Almaty branch of Impact Hub all function as gathering places for the tech industry and beyond—but most still need to evolve far beyond coworking spaces. Serbia is one example of a more developed community ecosystem, with its \$2bn in IT exports, and three well-run organizations that bring the IT community together. Impact Hub focuses on startups; Nova Iskra, on design and business; and StartIt, on business and technology. All appeared from the ground up over the last 8-10 years. All have their spaces in downtown Belgrade (where they also host coworking); StartIt also has several regional branches. A list of headlines of events from StartIt for two months of 2022 gives us an idea of what they do.

A sample of headlines and announcements from Belgrade's StartIt in September-October 2022:

- Article: What is product-market fit, and why is it important if you want to build a successful product?
- Article: Taking a lean approach to product development and how it contributes to business success
- Announcing the 56th IT knowledge sharing meetup
- Announcing SPLET Tech, a large IT conference to be held in eight locations around Belgrade
- Announcing the Belgrade R Meetup: The (RE)connection of the R community
- Announcing the first meeting of Data Science Club Belgrade
- Article: What is MVP, and how can it help create successful products?
- Applications open for a student course in technological entrepreneurship

Can one speed up the emergence of more community organizations in Central Asia and get them to deepen their focus? That is certainly feasible. Wherever something is already beginning to stir and small organizations are trying to build something driven first by idealism and second by profit motives, a little bit of support from donors, governments, or industry with few strings attached could go a long way.

Attract digital nomads

Digital nomads—people who earn their living online in IT or related fields and move from country to country in search of low costs, easy visa regimes, adventure, and community—are not coming to Central Asia en masse. The costs are low, and adventure is to be had—but visa regimes are not easy, and community is lacking. Sunny locations in Thailand understandably take top spots in various nomad rankings, but Eastern Europe still does well: in one popular ranking, Tbilisi is #13, and Belgrade, #17. The only two Central Asian cities to appear on that same ranking's 500-long list, Tashkent and Almaty, are #176 and #200. Is this a loss? Most certainly. Digital nomads may not drive IT export volumes—many of them only work as much absolutely necessary to meet their expenses and many also have a tendency to avoid paying any taxes—but they help build a strong IT ecosystem because a) they form a pool of workers from which local companies can quickly hire (as opposed to going through the process of looking for someone abroad) and b) they talk up their favorite destinations to those whom they know and, occasionally, write about them in the press. Central Asian capitals will not become popular with digital nomads overnight. Still, as IT growth picks up, governments would do well to consider at least loosening the visa restrictions enough (and, for Tajikistan, fixing the Internet) to encourage many of them to come. There are few if any downsides to such a move, and the benefits are plentiful.

Nomadlist.com rankings of digital nomad destinations, October 2022

1	Lisbon, Portugal
2	Canggu, Bali, Indonesia
3	Bangkok, Thailand
4	Mexico City, Mexico
5	Madeira, Portugal
6	Chiang Mai, Thailand
7	Berlin, Germany
8	Timisoara, Romania
9	Gran Canaria, Canary Islands
10	Buenos Aires, Argentina
11	Porto, Portugal
12	Istanbul, Turkey

13	Tbilisi, Georgia
14	Fuerteventura, Canary Islands
15	Portimao, Portugal
16	Lagos, Algarve, Portugal
17	Belgrade, Serbia
18	Bengaluru, India
19	Warsaw, Poland
20	Budapest, Hungary
...	
176	Tashkent
200	Almaty

Build the country’s image as an IT service provider with a particular value proposition

None of the four countries have a clear image as an IT service provider; which is the answer to an engineering client’s “Why are you better than India?” or an investor’s “Why should I bother to understand what is going on?” questions. The countries of Central Asia do pass the “CNN test” of being broadly acceptable to do business with, but some clients still will not work with their developers, let alone seek them out. As one CEO told us, “They hear the word ‘stan,’ and they don’t want anything to do with it.” That does not affect all clients, but it affects enough for this to be a problem. The issue seems less pronounced for Kazakhstan and Kyrgyzstan; Uzbekistan has more catching up to do; Tajikistan has the most work ahead. How can this be fixed? By answering the questions above. The answer to the first one—why is this destination better than India?—depends on the country, and is either “The costs are similar, but the quality is higher” or “The costs are lower, and the quality is comparable.” The answer to the second question—why an investor would bother—is currently less convincing and is along the lines of, “Lots of people are trying, and governments are helping (at least in Kazakhstan and Uzbekistan), and something will come out of it eventually.” Clients and investors need to hear these answers repeatedly: in the press, at industry exhibitions, at conferences, and in person. Many people are already doing some of this work: service exporting companies for the first question, VC funds for the second, and governments (IT parks especially) for both. This needs to continue, and there needs to be more of these efforts. It would also be good—especially for Kazakhstan and Uzbekistan—to have, in addition to coverage of their IT development written by professional PR firms, the kind of organic coverage that appears because someone in the press thinks that they have a good story to tell. For such kinds of stories, there are connections with homegrown companies (which are more attractive subjects for the press than branches of foreign companies) and, as we stated above, with digital nomads (the more of them around, the greater the chances that they will eventually become a country’s ambassadors abroad, which is what happened for Serbia and Georgia, and is to some extent happening now for Kyrgyzstan, which has the most flexible visa regime in Central Asia).

Experts consulted

The following experts were consulted for this report, by country, in October-December 2022. Most were interviewed in depth; several provided written responses to our questions.

Kazakhstan

- **Mirat Akhmedsadykov**, Most Ventures
- **Admet Akhter**, Akhter Studios
- **Boris Alexandrov**, EPAM Kazakhstan
- **Aida Dikhanbaeva**, StrategEast
- **Magzhan Madiyev**, Astana Hub
- **Kainar Mardenov**, Data Art Kazakhstan

Kyrgyzstan

- **Daniar Amanaliev**, Creative Industries Hub
- **Artem Belyaev**, Kanda Software
- **Elena Chigibaeva**, WeinCrypto DAO
- **Dastan Dogoev**, MyData.coin
- **Alla Klimenko**, Mad Devs
- **Avigail Menashe**, Kyrgyz Software and Service Developer Association
- **Ermek Omuraliev**, Ministry of Foreign Affairs
- **Oleg Puzanov**, Mad Devs
- **Nuradil Raimbekov**, USAID Future Growth Initiative
- **Aziz Soltobaev**, KG Labs
- **Talant Sultanov**, Kyrgyz Internet Society
- **Medet Tairov**, Bank Asia
- **Chubak Temirov**, High Technology Park
- **Gulzada Urgunaliyeva**, Unique Technologies
- **Yerdos Mendybayev**, Association of IT Exporting Companies in Kazakhstan

Tajikistan

- **Farhod Bilolzoda**, Ministry of Industry and New Technologies
- **Muhammadi Ibodulloev**, Civil Internet Policy Initiative
- **Nuriddin Lafizov**, Alif Moliya
- **Talat Numonov**, Centre ICT
- USAID Future Growth Initiative Tajikistan team

Turkmenistan

- Anonymous Expert #1
- Anonymous Expert #2

Uzbekistan

- **Botir Arifdjanov**, Astrum IT Academy
- **Muzaffar Karabaev**, zip24
- **Akmal Paiziev**, IMPACT.T Tech Hub
- **Sultonmurod Rasulov**, IT Park
- **Abdukahhor Tashmukhamedov**, GreenWhite
- **Yuliya Yakovleva**, Exadel Uzbekistan
- USAID Future Growth Initiative Uzbekistan team

Outside the region

- **Max Bogretsov**, EPAM (US)
- **Gaga Darsalia**, Redberry (Georgia)
- **Ani Kochiashvili**, Y Combinator (US)
- **Max Pachabut**, Sigma Software (Ukraine)
- **Filip Stoyanovich**, USAID Future Growth Initiative (US)
- **Anita Treger-Mlinarić**, Meta Group (Belgium)
- **Ivan Vaneev**, Truman Partners (Ukraine)

AT A GLANCE:

THE STATE OF IT EXPORTS AND IT EXPORT PROMOTION STRATEGIES ACROSS CENTRAL ASIA

Volumes of IT exports across Central Asia and comparison countries

	Kazakhstan	Kyrgyzstan	Uzbekistan	Tajikistan	Turkmenistan	Georgia	Ukraine	Belarus
Official IT exports in millions of dollars, 2021/2022 (est.)	\$50/200m	\$25/40m	\$46/140m	<\$1m	N/A	\$139m	\$6,943m	\$3,020m
IT exports per capita in dollars, 2021	\$3	\$4	\$1	<\$1	N/A	\$38	\$159	\$325

The qualitative state of the IT export industry across Central Asia

	Kazakhstan	Kyrgyzstan	Uzbekistan	Tajikistan	Turkmenistan
Large or mid-size foreign companies present	EPAM, DataArt	EPAM, iTechArt, Kanda Software	EPAM, Exadel	None reported	None reported
Notable domestic export-focused developers	Akhter Studios (~40 developers)	Mad Devs (100+ developers)	None reported	Silk Road Professionals (~30 developers)	None reported
Notable domestic export-focused product companies	pinemelon.com, avtoelon.uz, Parqour, WebTotem	Growave, D Billions, Tigi Boo	kpi.com, zip24, GreenWhite, workly.io, billz	Alif, zypl.ai	None reported

The current state of IT export promotion strategies across Central Asia

Note: Turkmenistan is only discussed in the first strategy group, “Improving foundations”; other strategy groups are not yet applicable to this country due to its complete lack of IT exports

Strategy group	Strategy	Current state
Improve the foundations	Address electricity and Internet issues	Electricity outages of up to 24 hours are an issue across the board; Internet speed and reliability are an issue in Uzbekistan and (especially) Tajikistan. In Turkmenistan, the state of the Internet makes running an export-oriented IT business nearly impossible.
	Improve English instruction	No hard data, but English skills are perceived to be lacking. Public schools are not providing adequate training; there is heavy reliance on private tutors and schools.
	Simplify immigration rules	Fairly restrictive except for Kyrgyzstan. US citizens need visas for Uzbekistan, Tajikistan, and Turkmenistan; they can stay visa-free in Kyrgyzstan and Kazakhstan for 60/15 days respectively. Special IT visas are available in Kazakhstan and Uzbekistan for companies registered in-country.
	Maintain country reputations	Generally acceptable in Kazakhstan, Kyrgyzstan, Uzbekistan, and Tajikistan; in 2022, protests in Kazakhstan and border clashes in Tajikistan/Kyrgyzstan did not last long enough to make an impact. Turkmenistan stands apart as its reputation would make marketing IT exports very difficult.
	Maintain/introduce preferential IT taxation	Available in Kazakhstan, Kyrgyzstan, and Uzbekistan, with fairly broad definitions of IT. There are no similar schemes in Tajikistan or Turkmenistan; discussions on setting one up are reportedly underway in Tajikistan.
	Maintain/consider introducing special legal regimes	Available in Kazakhstan: English law and judges for companies that register with Astana International Financial Center. No information on whether the other countries are considering similar schemes.
	Continue working on fundamentals: business climate, school education, quality of life	The business climate has significantly improved recently in Kazakhstan and Uzbekistan. The record in Kyrgyzstan and (even more so) in Tajikistan is mixed. There is great difficulty with running businesses in Turkmenistan due to the high degree of state control. School education and quality of life are at best average across the board, which will hinder long-term growth.
Get the developers	Train large numbers of junior developers (while being mindful of senior/lead developer bottleneck)	Most likely, there are not enough junior developers being trained to fulfill the ambitious IT export goals in Kazakhstan, Kyrgyzstan, and Uzbekistan. Kazakhstan and Uzbekistan are launching/have already launched large-scale publicly funded training programs; the effects are yet to be seen.
	Improve formal IT education (striking a balance between immediate market needs and long-term fundamentals)	This was not an area of focus for this report, though the interviewees’ sentiment was that there was nothing extraordinary to report.
Upgrade the industry	Tie financial incentives for IT industry to its export performance	Kyrgyzstan requires 80 percent of IT companies’ revenue to come from exports in exchange for preferential taxation. The other countries do not have similar requirements.
	Continue to attract large international companies	Prominent players are present in Kazakhstan, Kyrgyzstan, and Uzbekistan. No prominent players are present yet in Tajikistan.
	Help local service companies grow and scale	Isolated private initiatives exist (e.g., an Uzbek company setting up a course on software development businesses), but there is still a lot of room for improvement.
	Lay the foundations for product growth through mentoring, acceleration, angel investing, and VC funding	Multiple initiatives exist in all four countries; it is still too early to tell if they are having an impact. Angel investing is a particular area in need of improvement.
Feed the growth	Have single entities drive IT development	Present in Kazakhstan, Kyrgyzstan, and Uzbekistan; not present in Tajikistan. Kazakhstan and Uzbekistan’s approaches are top-down, government-controlled, and well-funded. The Kyrgyzstan approach is bottom-up, relatively independent, and poorly funded.
	Work with local IT and business associations	Local IT association is strong in Kyrgyzstan; similar associations elsewhere are weak to nonexistent.
	Support a multitude of community organizations	Several initiatives exist in Kazakhstan, Kyrgyzstan, and Uzbekistan; most are focused on co-working and would benefit from greater technical/business focus.
	Attract digital nomads	Central Asia is not popular with the digital nomad community; there is plenty of potential (beautiful nature, low costs), but migration regimes (everywhere except Kyrgyzstan) and poor Internet (in Tajikistan and to a lesser extent in Uzbekistan) are the main issues to be addressed.
	Promote IT industry abroad as having a particular value proposition	Isolated efforts exist (including promotion by large foreign companies), but much more significant focus is required (e.g., promotion at industry events).



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