



Economic and Social Commission for Asia and the Pacific

**An In-Depth Study of Broadband Infrastructure
in North and Central Asia
January 2014**

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I. EXECUTIVE SUMMARY

Between June and November 2013, Terabit Consulting performed a detailed analysis of the broadband infrastructure in the seven key markets in North and Central Asia: Azerbaijan, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkmenistan, and Uzbekistan.

The analysis revealed that the region is greatly reliant upon trans-border terrestrial fiber optic connectivity, which places it at a distinct competitive disadvantage relative to coastal markets, which benefit from submarine fiber optic cable systems offering higher capacity, greater cost effectiveness, and more extensive reach than the region's existing terrestrial connectivity. With the exception of the Russian Federation, none of the countries in this study have oceanic coastlines. Consequently, each landlocked country is at an inherent disadvantage to coastal countries with respect to access to cost-effective international bandwidth; while the cost of providing international bandwidth to coastal countries is limited to actual cable infrastructure costs, landlocked countries bear not only the actual cable infrastructure costs but also the bandwidth transit and interconnection costs imposed by their neighbors. One of the countries analyzed in the study, Uzbekistan, is "doubly-landlocked," a status which makes the country's access to affordable international bandwidth exceedingly challenging.

The analysis showed that there are existing fiber optic links across every international border of each country in the study, with the exception of the militarized border between Azerbaijan and Armenia. There is one multinational fiber optic network, the Trans Asia Europe (TAE) Line, which was implemented in the late-1990s, but most sources indicated that the system has never functioned as a coherent network in the way that it had been expected to, and that its low capacity has effectively rendered it obsolete. Each of the other international links identified in the study were low-capacity, trans-border links, typically operating at no more than a few gigabits per second.

As is the case across Asia, the bilateral, point-to-point nature of the links, combined with the disparities in IP transit prices between wealthier and less-developed markets, often allow dominant operators in wealthier nations to exploit the terrestrial links by using them to sell their own IP transit capacity, thereby imposing an additional intermediate layer of cost between consumers and the international Internet content that they wish to access. The study clearly revealed that landlocked countries' telecommunications and Internet development, and consequently their overall ICT growth, have been greatly restrained by the countries' reliance on piecemeal bilateral trans-border links and lack of access to high-capacity pan-regional and intercontinental infrastructure.

A strong opportunity presents itself for a pan-regional terrestrial fiber optic network offering open access, a mesh configuration, and central management, constructed along the rights-of-way of the region's existing transport or energy infrastructure such as highways, railways, or power transmission networks. The realization of such a network would likely require the intervention of governments and international organizations.

Terabit Consulting's analysis indicates that the region would greatly benefit from a coherent pan-regional fiber optic infrastructure across Asia, for three primary reasons:

The development of telecommunications and Internet services and infrastructure in Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, and each country's economy as a whole, has greatly suffered as a result of restricted international infrastructure.

International Internet bandwidth in each of the four countries is less than 1 Kbps per person, compared to levels of between 16 and 23 Kbps in Azerbaijan, Kazakhstan, and Russian Federation, and more than 250 Kbps in markets such as Singapore. The resulting underdevelopment of the four countries' telecommunications and Internet infrastructure has impeded and will continue to impede the overall economic development of each market and the region as a whole, with the countries' existing bilateral, trans-border fiber optic links and lack of access to cost-effective pan-regional connectivity leaving the region at a serious competitive disadvantage.

Internet growth in the four markets has suffered as the cost of a fixed broadband connection remains at between 15 and 26 percent of nominal per-capita GDP, compared to between 0.2 and 2.2 percent in Azerbaijan, Kazakhstan, and Russian Federation. The analysis also identified Internet service providers in Kyrgyzstan, Tajikistan, and Uzbekistan that distinguish between domestic and international content, with different bandwidth caps for each. Although the bandwidth caps have the short-term effect of encouraging the growth of domestic content, they risk further isolating each country from the global Internet community. Internet service providers in the region have implied that the distinction between international and domestic bandwidth is likely to remain in place as long as the region's inflated international IP transit prices persist.

Despite their developed international connectivity, the three wealthiest markets in the study (Azerbaijan, Kazakhstan, and Russian Federation) would greatly benefit from improved pan-regional terrestrial fiber infrastructure.

Overall, the international telecommunications and bandwidth infrastructure in Azerbaijan, Kazakhstan, and Russian Federation are better developed than in the other four countries of the study. However, a coherent, cost-effective pan-regional terrestrial fiber infrastructure would compensate for existing shortcomings of the countries' international networks and help to place them on a par more connected markets in Western Europe, Southeast Asia, and North America. Even the sole coastal country in the study with access to submarine fiber optic cables, Russian Federation, would benefit. Russian Federation is served by only a handful of submarine cable systems, the direct connectivity of which is limited exclusively to nearby markets such as Scandinavia, Japan, and the Black Sea/Eastern Mediterranean Region. Although this submarine connectivity is supplemented by proprietary (closed-access) terrestrial networks through China and Eastern Europe, none of the existing terrestrial networks offer the high capacity, cost efficiencies, and multinational access that a coherent next-generation pan-Asian fiber infrastructure would provide.

Furthermore, the markets in the study with stronger international networks would benefit from the stimulated demand in the telecommunications and ICT sectors (as well as the overall regional

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