Technology Market Assessment: Ukraine 2016

Version 1.1.1

January 28, 2016

Phillip J. Hatch

Data

Root Metrics

Root metrics for this report come from the following sources:

- http://data.worldbank.org/
- http://data.un.org/
- https://data.oecd.org/
- https://www.transparency.org/cpi2014/results
- http://www.theglobalipcenter.com/gipcindex/
- http://www.unesco.org/new/en/unesco/resources/online-materials/publications/unesdoc-database/
- http://comtrade.un.org/data/

About Akholi

Akholi Research provides detailed insight into overall workforce and economic performance through detailed quantitative research and modeling. Through our research and modeling process, we help countries:

1. Understand factors limiting their overall growth.
2. Define the best path for improving their economy and creating jobs.
3. Understanding how top global employers view the country.
4. Improve global private sector participation in both workforce and economic development.

Founded by an executive team with lengthy private sector leadership and government advisory experience, we have helped countries understand and address a variety of workforce, immigration, job creation and economic development issues.

We are the leaders in regards to helping drive greater private sector involvement in the development of both a future state workforce and greater economic growth.

About Mr. Phillip J. Hatch

Mr. Hatch is a twenty-year global strategy, workforce and economic development executive with extensive experience working with both public and private sector leaders.

Mr. Hatch has helped many of the world's top employers better understand global economic and workforce trends. For clients such as Boeing, Microsoft, UBS, Goldman Sachs and Credit Suisse, Mr. Hatch has helped them with a variety of issues including:

- Defining, planning and implementing global expansion.
- Defining, planning and implementing strategic workforce framework.
- Resolving global operations issues.
- Opening captive centers in new markets.

Mr. Hatch has worked extensively with global government leaders as well. For countries such as Canada, India, China, Mexico, Chile and Russia, Mr. Hatch has countries around the world:

- Address labor shortages and refining foreign worker programs.
- Define, plan and implement both workforce and economic development programs.
- Define, plan, implement and improve performance of trade and industry specific special economic zones.
- Facilitate partnerships between leading global private sector employers and State institutions to develop both a future state workforce and collaborative industry development programs.

Mr. Hatch is a noted thought leader in this space and has published, contributed to or been cited by hundreds of research reports, books and articles covering a variety of global strategy, economics and workforce related topics.

Acknowledgements

This report would not have been possible without the participation of key thought leaders. I wish to extend a special appreciation to:

Mr. Yevgen Sysoyev

Mr. Sysoyev is a founding and managing partner at AVentures Capital, a major international venture capital fund that mostly focuses on investments in international startups with R&D in Ukraine and CIS countries. Serving on the board of several software technology companies, he was named the most influential person in the Ukrainian IT sector in 2013 and 2014.

Mr. Adrien Henni

Mr. Henni is co-founder of the EWDN network, a group of online publications dedicated to innovation in Eastern Europe (Ukraine: UADN.NET, Russia: EWDN.COM). With 15 years of experience in the high-tech and venture businesses in France and Eastern Europe, he advises a variety of funds, startups and other organizations.

A copy of the report produced by Mr. Sysoyev and Mr. Henni can be found at http://uadn.net/files/ua_hightech.pdf

Ukrainian Technology Export Market Summary

January 21, 2016

We recently completed a comprehensive assessment of the Ukrainian economy.

Key findings from our research are as follows:

1. The Ukrainian economy should be over $1 trillion today.
2. Every aspect of the Ukrainian economy is underperforming.
3. The crisis in Ukraine is having a significant negative effect on all facets of the Ukrainian economy.
4. Ongoing corruption issues and concerns over IP protection have had a larger impact on the Ukrainian economy than the current crisis.
5. With top-tier science, technology, engineering and mathematics (STEM) skills and an extremely large tertiary educated workforce, Ukraine can be a true global technology center.
6. Technical Goods and Service Exports are Ukraine's best chance for achieving significant economic growth.
7. Until ongoing corruption issues are resolved, Ukraine will not be able to grow Technology and ICT related Goods Exports.
8. But, Ukraine can achieve significant growth from ICT Service Exports (including IT outsourcing). Based on our modeling, Ukraine can grow ICT Service Exports from Ukraine's current 5-year peak $5 billion to $75 billion while Ukraine addresses corruption.
9. If Ukraine were to achieve our full ICT Service Exports target while all other exports remained flat, Ukraine would likely grow GDP Market Price $ from $183 billion to $325 billion.
10. Once Ukraine resolves corruption issues, Ukraine can achieve significant growth in ICT and High-Tech (non ICT technology) Goods Exports. Currently, Ukraine has total technology goods exports of slightly over $3 billion per year (5-year peak value). At targets, Ukraine can achieve over $200 billion in technology related Goods Exports establishing Ukraine as a true global technology leader.

There are no doubts Ukraine presents both great opportunity and an incredible challenge. While Ukraine cannot achieve full potential until risk related to corruption, IP protection and the crisis are resolved, there is still an immediate opportunity for growth if Ukraine aggressively pushes high-value service exports and outsourcing. If Ukraine can resolve ongoing risk from corruption, IP protection and the current crisis, Ukraine is poised to be the next global technology star.

Phillip J. Hatch
phillip.j.hatch@akholi.com
www.akholi.com

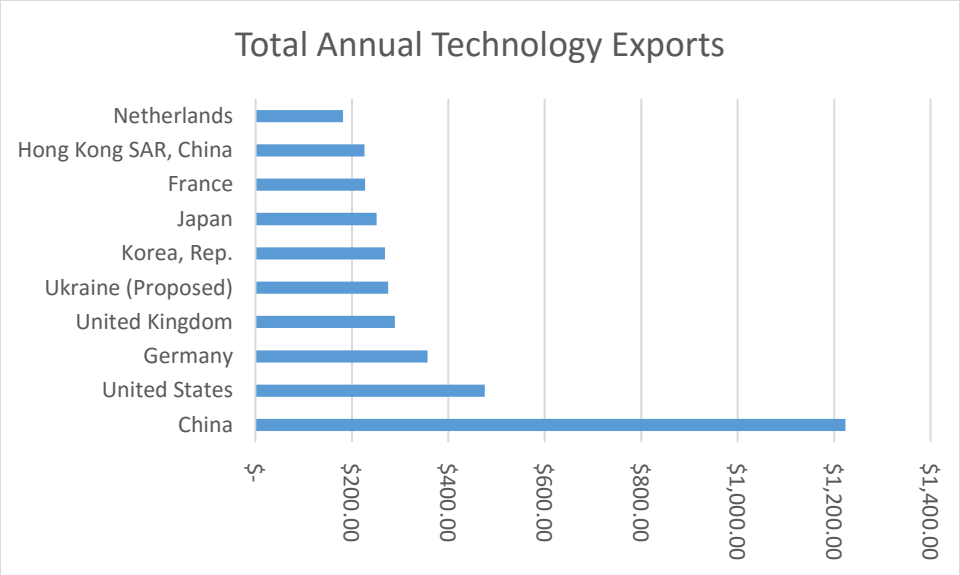
Ukrainian Technology Exports

Ukraine Opportunity: Become the Next Global Technology Leader

In our Ukraine Economic Assessment: 2016 study, we modeled Ukraine's current economy performance and defined aggressive but achievable targets for key economic indicators as follows

	GDP	**Total Exports**	**goods exports**	**Service Exports**	High-Tech Goods Exports	ICT Goods Exports	ICT Service Exports
Current	*$183.10*	$83.88	$64.43	$22.61	$2.62	$0.71	$5.02
Model 1	*$487.70*	$144.41	$117.12	$31.81	$12.80	$11.57	$9.94
Model 2	*$640.80*	$414.90	$321.05	$78.22	$30.21	$34.76	$21.92
Model 3	*$772.30*	$309.31	$201.07	$87.74	$15.41	$33.05	$19.49
Model 4	*$926.30*	$718.65	$606.34	$154.77	$69.01	$79.95	$38.49
Model 5	*$1,136.50*	$837.35	$700.24	$236.80	$101.50	$122.30	$63.35
Model 6	*$1,487.90*	$564.42	$441.66	$116.84	$36.50	$25.03	$23.09
Model 7	*$1,656.60*	$696.80	$519.31	$193.67	$58.74	$28.02	$66.38
Model 8	*$1,673.70*	$747.26	$651.28	$229.76	$45.57	$66.74	$75.38
Model 9	*$2,797.20*	$1,652.47	$1,006.48	$660.08	$86.08	$109.75	$169.53
Model 10	*$7,430.80*	$10,812.06	$3,831.85	$8,052.67	$1,145.08	$1,334.01	$1,718.82
Akholi Target	$1,125.00	$500.00	$350.00	$150.00	$100.00	$100.00	$75.00
Growth Ratio	6.14	5.96	5.43	6.63	38.17	140.85	14.94
	(values in billion USD)						

Out of all economic indicators we modeled, Ukraine's technology related exports have the highest potential for growth. No other export can transform the Ukrainian economy to the level technology exports can if Ukraine achieves full targets. Very few countries have the same degree of growth opportunity that Ukraine currently has.



If Ukraine achieves these targets, Ukraine will become the 5th largest technology exports market globally and will rank 3rd in the greater European region.

The impact to the greater Ukrainian economy would be massive.

	Current ($ billion)	Future ($ billion)
GDP Market Price $	$183	$850
Total Exports	$84	$400
Goods Exports	$64	$310
Service Exports	$23	$90
Technology Goods Export	$3	$200
Technology Service Exports	$5	$75

The above chart illustrates a likely future state if Ukraine achieves technical export targets while keeping all other exports flat.

This target is optimistic and drives the question “Is it possible?”

Argument 1: Understanding Akholi Modeling

	GDP	Total Exports	goods exports	Service Exports	High-Tech Goods Exports	ICT Goods Exports	ICT Service Exports
Current	*$183.10*	$83.88	$64.43	$22.61	$2.62	$0.71	$5.02
Model 1	*$487.70*	$144.41	$117.12	$31.81	$12.80	$11.57	$9.94
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Akholi Target	$1,125.00	$500.00	$350.00	$150.00	$100.00	$100.00	$75.00
Growth Ratio	6.14	5.96	5.43	6.63	38.17	140.85	14.94

Targets defined above are created using a series of quantitative models. Each quantitative model is created through comparison of various markets to Ukraine on a strict Per Capita basis. This allows us to gauge the overall performance of all countries based on performance relative to the size of each country's population rather than just look at a total top value.

A summary definition for each model is as follows:

	Model Name	Description
Base	Current Ukrainian performance	5-year peak value for Ukraine.
Model 1	World Average	Average Per Capita rate of all countries globally.
Model 2	CE Regional Average (All Countries)	Average Per Capita rate of all countries within the greater Central and Eastern European region.
Model 3	Metric 2nd Quintile Average	Average Per Capita rate of countries ranking within the metric's 2nd top quintile.
Model 4	CE Region Top 5 Country Average	Average Per Capita rate of the top five metric performing countries within the Central and Eastern European region.
Model 5	CE Region Top Country Rate	Average Per Capita rate of the single top metric performing country within the Central and Eastern European region.
Model 6	13th Ranked Country Equiv. Rate	Average Per Capita rate needed to achieve the 13th largest value globally representing Ukraine's rank as the 13th largest tertiary educated labor force.
Model 7	European Union Average	Average Per Capita rate of all countries within the European Union.
Model 8	Top Tertiary Education Rate Quintile Av.	Average Per Capita rate for the metric by all countries ranked in the top Tertiary Education Rate Quintile.
Model 9	Top Metric Quintile Average	Average Per Capita rate of all countries ranked within the metric's top quintile.
Model 10	Top Metric Performer Rate	Per Capita rate of the country performing the best on a Per Capita basis to establish a theoretical metric cap.

An explanation of each model leveraged to define our targets for technology exports indicators are as follows:

High-Tech Goods Exports

High-Tech goods exports (non-ICT) are defined as any export with a material R&D cost and requiring a degree of advanced education in both the produce development and manufacturing process. For our target value of $100 billion, we leveraged the following models:

1. Low Target (Model 9): $86.08 billion.
   High-Tech Goods Exports presents an interesting global dynamic with a small number of countries dominating the top ranks. Model 9 calculates the total value based on the average Per Capita rate of the world's top High-Tech Goods Quintile (top 20% of all countries). In almost every other indicator we model, Model 9 presents a theoretical value significantly higher than what we defined as our target. With the rapid fall in total technology exports per

capita as we move out of the top ten global markets, Model 9 skews low and sets our low bar for our target.

The average Per Capita rate for this model is $1,889.82. If Ukraine were to perform at this level, Ukraine's annual total High-Tech Goods Exports would be $86.08.

2. High Target (Model 5): $101.50
   The Akholi Model 5 defines the total indicator value Ukraine would achieve if Ukraine were to perform at the same High-Tech Goods Exports Per Capita rate of the Central and Eastern European High-Tech Goods Exports leader Czech Republic.

   Czech Republic currently has a High-Tech Goods Exports Per Capita rate of $2,226.15. If Ukraine were to achieve the same Per Capita rate, Ukraine would have a total High-Tech Goods Exports of $101.5 billion.

ICT Goods Exports

ICT Goods Exports (excludes IT outsourcing and software packages developed on contract for specific clients outside Ukraine- included in ICT Service Exports) is Ukraine's single lowest performing indicator. Regardless of Ukraine's high Tertiary Education Rate or high STEM skills density, Ukraine should improve these numbers.

1. Low Target (Model 4): $79.95 billion.
   Our low target is defined by Model 4, or an average ICT Goods Exports Per Capita value of the top 5 countries within the greater Central and Eastern European region.

   The top 5 markets in the Central and Eastern European market in regards to ICT Goods Exports Per Capita are as follows:

Country	**ICT Goods Exports Per Capita**
Latvia	$496.94
Estonia	$1,332.08
Czech Republic	$2,013.78
Hungary	$2,242.97
Slovak Republic	$2,682.50
Average Per Capita	$1,753.66

If Ukraine were to perform at this level on a Per Capita basis, Ukraine's ICT Goods Exports total value would be $79.95 billion

2. High Target (Model 5): $122.30 billion
   We use Model 5 to define our theoretical high target in regards to ICT Goods Exports. The greater Central and Eastern European region top performer (Slovakia) has an ICT Goods Exports Per Capita rate of $2,682.50. If Ukraine were to perform at this level, Ukraine would export $122.30 billion in ICT Goods each year.

ICT Service Exports

While Ukraine's ICT Service Exports have been steadily growing until 2014, Ukraine's 5-year peak is underperforming.

To calculate our targets, we leveraged the following models:

1. Low Target (Model 5): $63.35 billion
   For our low target, we leveraged Model 5- or the highest Per Capita rate of the greater Central and Eastern European region. The region's top performer (Estonia) has a rate of $1,392.58 ICT Service Exports Per Capita. If Ukraine achieves the same Per Capita performance, Ukraine's annual total ICT Service Exports would be $63.35 billion.

   This represents the only time we set a target value that would place Ukraine at the top in the greater Central and Eastern European region on a Per Capita performance basis. We justify this based on three arguments:

   a. Ukraine cannot achieve success in technology related goods exports until corruption and IP protection issues are resolved. In terms of high value exports, ICT Service Exports presents the single best option for Ukraine now. If Ukraine were to make ICT Service Exports a priority while addressing greater corruption and IP protection issues, there is very little reason why Ukraine should not be the region's top performer.

   b. Demographics act in Ukraine's favor. Ukraine has both a higher Tertiary Education Rate than Estonia and a larger total workforce. Estonia must be viewed as a success story and we do not want to understate respect for what they have achieved. That said, the overall population is small and there will be scalability concerns limiting their ability to become a true destination outsourcing location. Estonia will likely continue to achieve success as a niche player. Ukraine, with a large enough population to be considered a true destination outsourcing center, can achieve an additional degree of growth.

   c. The greater Central and Eastern European region is not considered a hotspot for ICT Service Exports. While there is a mature industry and several top tier vendors, the greater region underperforms. This is a bit

of a surprise. The Central and Eastern European region has a great deal to offer in regards to ICT Service Exports. That said, no country in region has made ICT Service Exports a top State level priority. If Ukraine were to make ICT Service Exports a true State level priority, there is little reason to believe Ukraine cannot achieve regional leadership within this area.

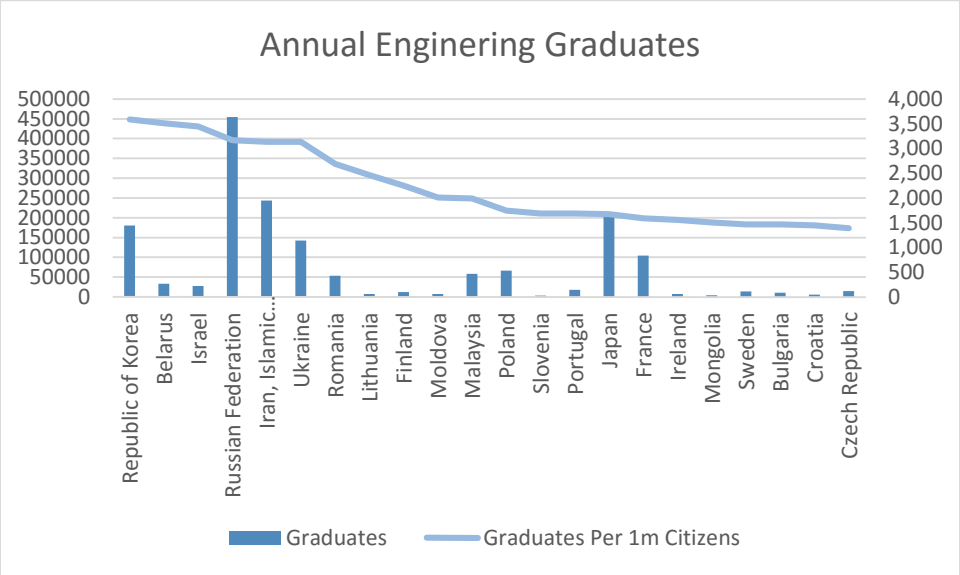
2. High Target (Model 8): $75.38 billion
   Ukraine is an extremely educated country with a Tertiary Education Rate that ranks higher than the average of all countries in the top Tertiary Education Rate Quintile.

   Model 8 takes the average Per Capita performance of all countries within the top Tertiary Education Rate Quintile. The average ICT Service Exports Per Capita rate for this Quintile is $1,657.41. If Ukraine were to achieve the same ICT Service Exports Per Capita rate, Ukraine's annual ICT Service Exports would total $75.38 billion.

   This may seem optimistic, but, consider countries that are within the same Tertiary Education Rate Quintile. There are many countries within the top Tertiary Education Rate Quintile that skew the model low (including Ukraine). As an example:

Country	**ICT Service Exports Per Capita**
Turkey	$10.01
Ukraine	$110.38
Russian Federation	$157.56
Belarus	$166.49
Argentina	$168.47
Chile	$184.45
Bulgaria	$259.68

Argument 2: STEM education Rates



In the graph above, we chart both total engineering graduates per year (columns) and the total number of annual engineering graduates per 1m citizens (row).

Ukraine ranks 8th in regards to the total number of engineering graduates each year (in addition those in the chart above, the United States, China and India produce more annual graduates) and ranks 6th in regards to engineering graduate density.

In terms of labor force with STEM skills size, Ukraine ranks 8th globally in terms of total size.

STEM Labor Force Size Global Rank	**Country**	**Annual Technology Exports (billion)**
7	Korea, Rep.	$268.61
8	Ukraine	$7.76
9	France	$227.79

In the above chart, we compare total technology exports against the 7th, 8th and 9th STEM skilled labor forces. Note that Ukraine is an anomaly. Simply based on the size of Ukraine's STEM labor force, Ukraine should be generating annual tech exports well above $200 billion.

Of special note: Ukraine has both higher STEM Total Graduates and a higher STEM Graduates Per Capita rate than Czech Republic, Estonia, Latvia, Lithuania, Slovakia and Slovenia. All of which are used as either a member of a regional top 5 model or set the high standard within the Central and Eastern European region in regards to technology goods and Service Exports.

In terms of STEM skills density, Ukraine ranks 6th globally.

Although comparisons present specific flaws, it helps to compare Ukraine (as the world's 6th highest STEM skills density country) against the top global Technology Exports Per Capita countries.

Global Rank	Country	Tech Exports Per Capita
1	Singapore	$56,506.12
2	Luxembourg	$31,921.04
3	Hong Kong SAR, China	$31,494.95
4	Ireland	$23,859.93
5	Malta	$11,722.87
6	Netherlands	$10,898.62
7	Switzerland	$10,521.44
70	Ukraine	$170.54

If this were a perfect world and Ukraine, with the 6th highest STEM skills density, were to be the 6th highest Technology Exports Per Capita country (equating to Netherland's $10,898.62 Technology Exports Per Capita), Ukraine's total Technology Exports would be over $477 Billion per annum.

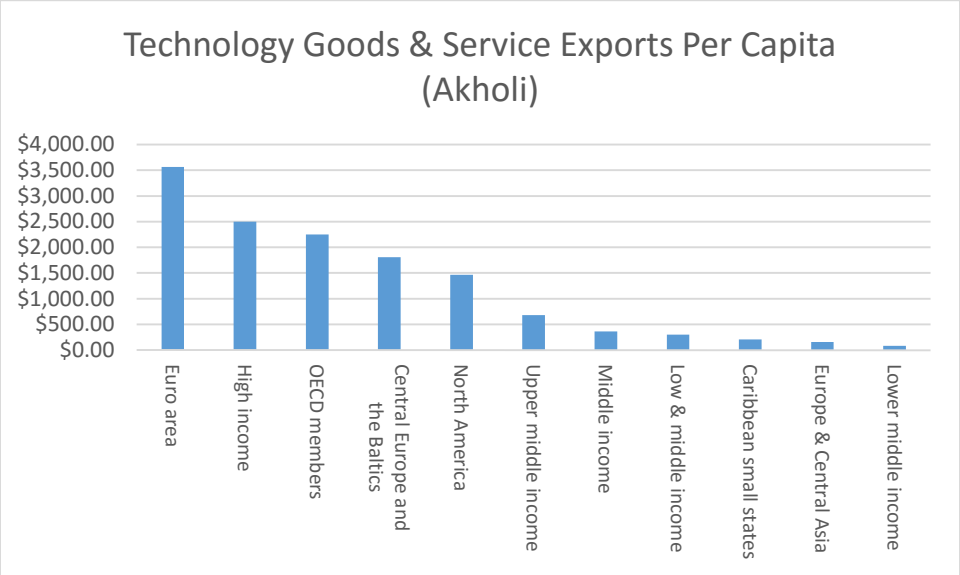
If Ukraine were to achieve the Technology Exports target we defined in this report- $275 Billion ($200 Billion in goods exports and $75 in ICT Service Exports), Ukraine's Technology Exports Per Capita would equate to $5,995.10.

Country	Technology Exports Per Capita
Belgium	$7,752.21
Sweden	$6,993.75
Ukraine (Proposed)	$5,995.10
Korea, Rep.	$5,348.72
Austria	$5,299.03
Czech Republic	$4,964.57
Hungary	$4,881.24
Israel	$4,815.32
Malaysia	$4,806.90
Slovak Republic	$4,626.37
Denmark	$4,440.33

We acknowledge our targets as being aggressive. The resulting Technology Exports Per Capita would rank Ukraine ahead of proven global technology leaders such as Korea, Czech Republic and Israel. That said, our target results in a Technology Exports Per Capita rate that is not that dissimilar. Our targets would

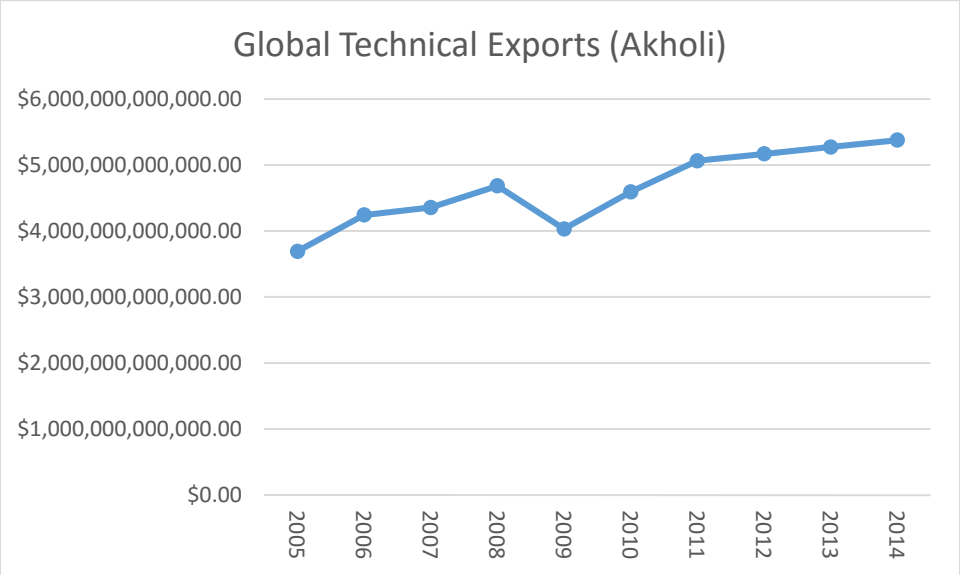
establish Ukraine as a true global technology leader. Based on Ukraine's Tertiary Education Rate, workforce size and STEM skills density, we feel these are reasonable targets to aim for if Ukraine can resolve ongoing risk related to corruption, IP protection and the current crisis.

Argument 3: Global Demand for Regional Technology Goods and Services



Central and Eastern Europe ranks only behind the EU in regards to geographic total technology exports Per Capita. Central and Eastern Europe exports more technology on a Per Capita basis than North America, Asia and Latin America. If we exclude those countries in Central and Eastern Europe that significantly trail the regional average (Ukraine being one of them), the region moves into the top spot. There is clearly both global demand from and capability to produce technology within region.

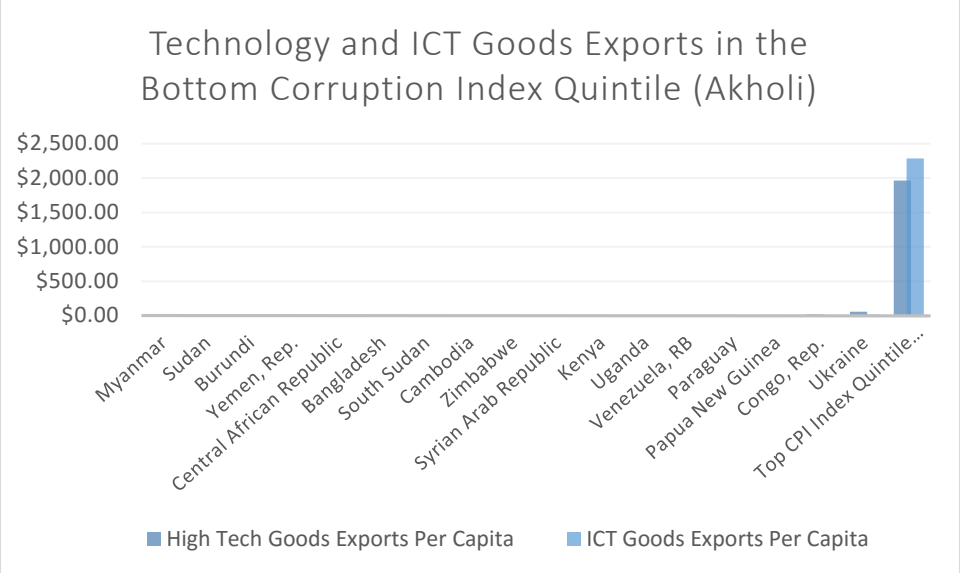
Argument 4: Global Demand



Over the past 10 years, global technical exports have grown by $1.7 trillion to an estimated value of $5.4 trillion in 2014. Although there have been occasional downturns in the overall market, this growth will continue well into the future as the we transition into an even more technical and automated world.

The global market is large (and growing) enough to absorb annual increases in Ukrainian technology exports as Ukraine moves towards the targets we set. While we feel the targets are achievable, they are aggressive enough that Ukraine will need to prove innovation and be prepared to take market share.

Threat: IP Protection and Corruption



In Transparency International's CPI index, Ukraine ranks within the bottom quintile with a score of 26. Corruption has a massive impact on a country's ability to export technology related goods.

In our research, no country with similar corruption problems has ever achieved material technology related goods exports. In the chart above, we compare Technology Goods Exports Per Capita of countries in the bottom CPI index Quintile against the average Technology Goods Exports Per Capita of countries in the top CPI index Quintile. There is an absolute and obvious trend.

Countries with similar CPI scores to Ukraine have attempted to boost high-value and technology related exports through a variety of strategies. Trade zones, trade agreements, State backed growth funds, etc. None of them work without first addressing corruption.

It is clear that Ukraine must resolve ongoing corruption and IP protection issues if Ukraine is to achieve material growth in high-value Technology Goods Exports.

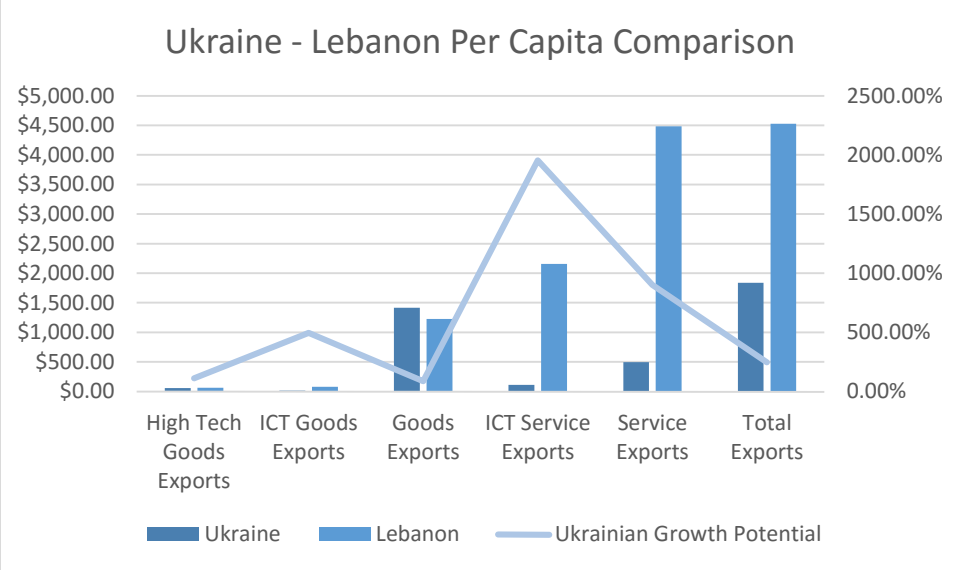
While countries have never been able to materially grow Technology Goods Exports while suffering from corruption issues similar to Ukraine, some countries have proven viability for High-Tech Service Exports.

	Ukraine	Lebanon
tertiary education rate	79%	49%
CPI Score	26	27
CPI Rank	142	136
2014 GDP Per Capita	$4,029.72	$10,057.89
2014 Total Exports Per Capita	$1,839.84	$4,529.96
2014 Goods Exports Per Capita	$1,413.08	$1,001.19
2013 Service Exports Per Capita	$497.10	$3,224.94
2014 ICT Service Exports Per Capita	$110.38	$2,157.43

Lebanon, with:

- A tertiary education rate that is 62% of Ukraine's
- A nearly identical corruption index score
- A massive ongoing conflict within neighboring countries
- And recent military conflicts in country

… posted 5-year peak values in 2014 demonstrating higher performance than Ukraine regardless of the above challenges.



If Ukraine were to match Lebanon's ICT Service Exports Per Capita rate of $3,224.94, Ukraine's total ICT Service Exports would be $97.7 billion- an increase of over $92.7 billion from Ukraine's current ICT Service Exports levels. (Well above our target of $75 Billion).

Vision: Become a Global Technology Leader

While Ukraine continues to have significant challenges ahead due to ongoing risk, we reiterate our challenge to the Ukrainian government to become a global technology leader. Set the goal of being one of the top markets and create a brand for Ukraine that places Ukraine within the ranks of Japan, Korea and United Kingdom as global technology leaders. Through actions to achieve this vision, Ukraine will transform the entire country.

Doing so will not be easy, but, it is possible. Ukraine has the primary raw materials to achieve this goal in a large STEM Labor Force. In order for Ukraine to achieve this vision, Ukraine will need to do the following:

Immediate

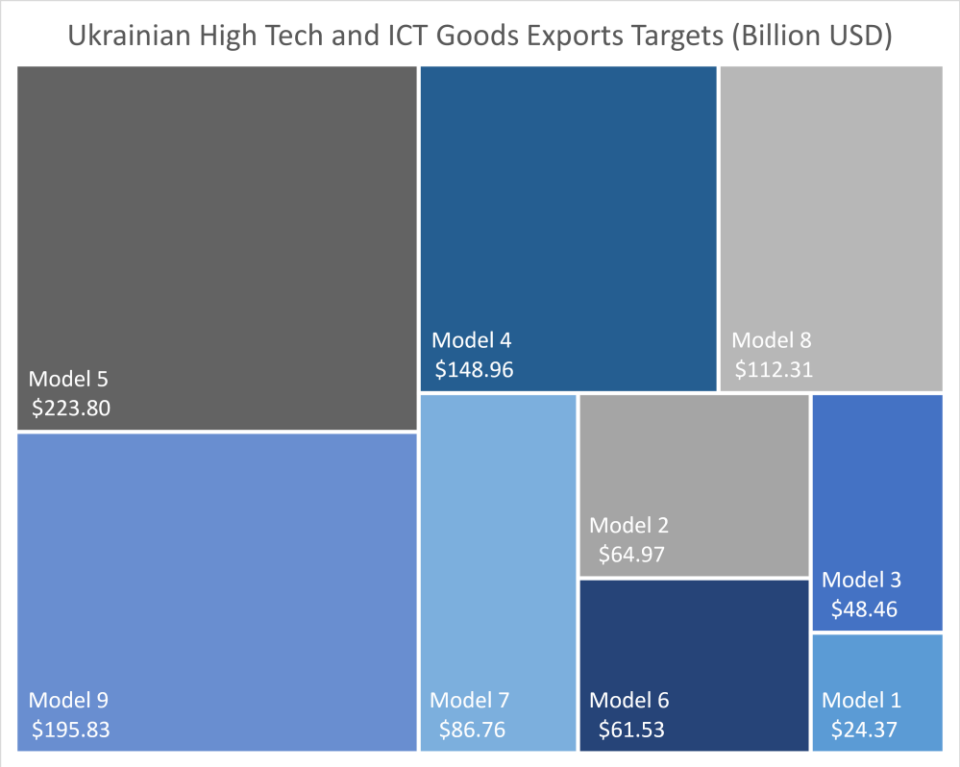
- Continue the fight against corruption and IP protection concerns.
- Implement a program to agressively grow ICT Service Exports.
- Implement a program to greatly increase participation of global employers in the development of a future state Ukrainian workforce.
- Implement a program to help seed and mature additional Ukrainian vendors.

Future

- Continue to establish Ukraine as a leader in regards to corruption and IP protection.
- As risk related to corruption, IP protection and concerns over the current crisis in Ukraine resolve, agressively seed and push High-Tech and ICT Goods Exports.
- Establish Ukraine as the premier destiantion for High-Tech and ICT related captive centers.

This challenge is aggressive, but, it is possible. If Ukraine sets this as a true State strategic objective and aggressively works toward each of the items above, Ukraine can achieve the goal of being a true global technology leader.

High-Tech and ICT Goods Exports



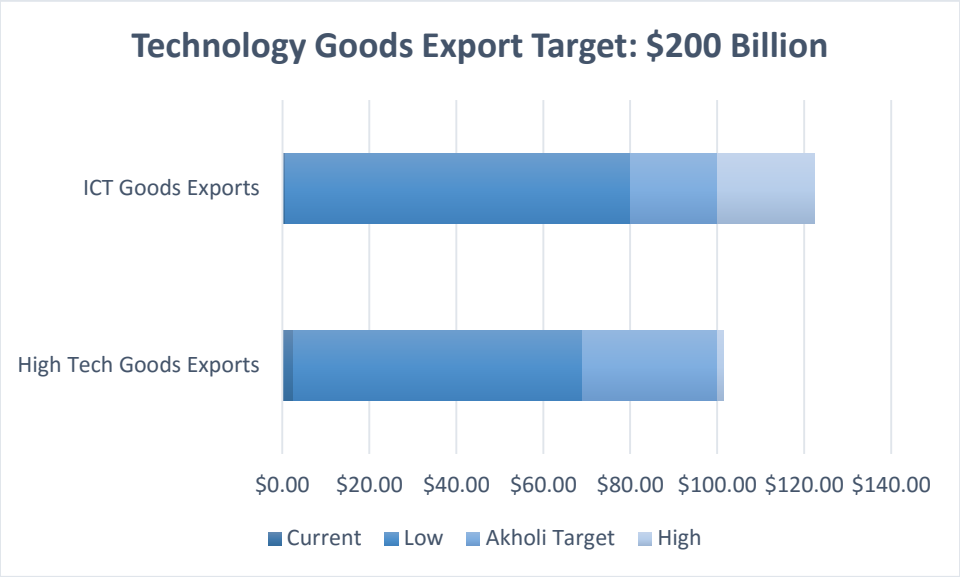
Both Ukrainian ICT Goods Exports and High-Tech Goods Exports are greatly underperforming when comparing Per Capita rates against every model we use.

No other area presents as significant of an opportunity for Ukraine. At the same time (and continuing a theme throughout this report), no other area will be as difficult to develop until Ukraine resolves corruption and IP protection concerns.

When Ukraine resolves these risks, Ukraine is uniquely poised to aggressively grow. In addition to Ukraine's large and highly technical tertiary educated labor force, Ukraine has sizable State assets to leverage in regards to growth of technical goods exports. There are real opportunities to develop unique and highly compelling ventures leveraging these assets.

Immediately, Ukraine should begin to seed partnerships with top Ukrainian Higher Education institutions that have compelling stories within the technical goods exports space and leading global private sector firms. While Ukraine will likely not be able to gain material investment from these global firms at this time, Ukraine can leverage their insight into aligning these institutions and facilities with the needs of top global employers. In addition to building a future state workforce, Ukraine can find future opportunities to leverage facilities inside these institutions to rapidly grow technical goods exports.

Based on data, we set Ukraine's targets for technical goods exports as follows:



Both ICT goods and High-Tech Goods Exports targets of $100 Billion (for a combined $200 Billion) are aggressive. That said, the resulting Per Capita rate for both will place Ukraine below the top performer in the greater Central and Eastern European region.

High-Tech Goods Exports Per Capita		ICT Goods Exports Per Capita	
Czech Republic	$2,226.15	Slovak Republic	$2,682.50
Akholi Target	$2,195.42	Akholi Target	$2,195.42

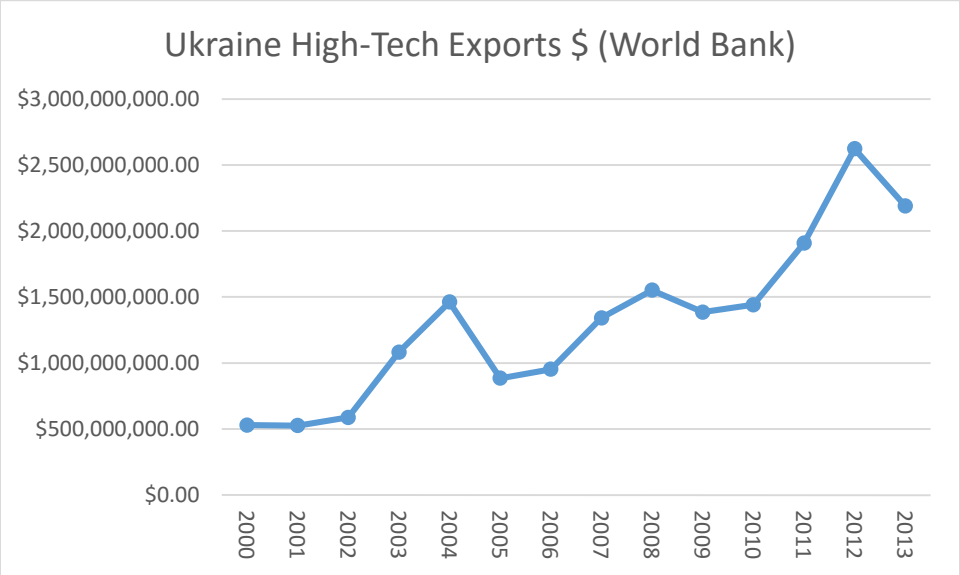
If Ukraine resolves corruption and IP protection concerns- and makes a concerted effort to become a global technical exports leader, Ukraine can achieve these targets. Ukraine has the labor force size, tertiary education rates, STEM skill densities and compelling State assets necessary to achieve them.

High-Tech Goods Exports Models

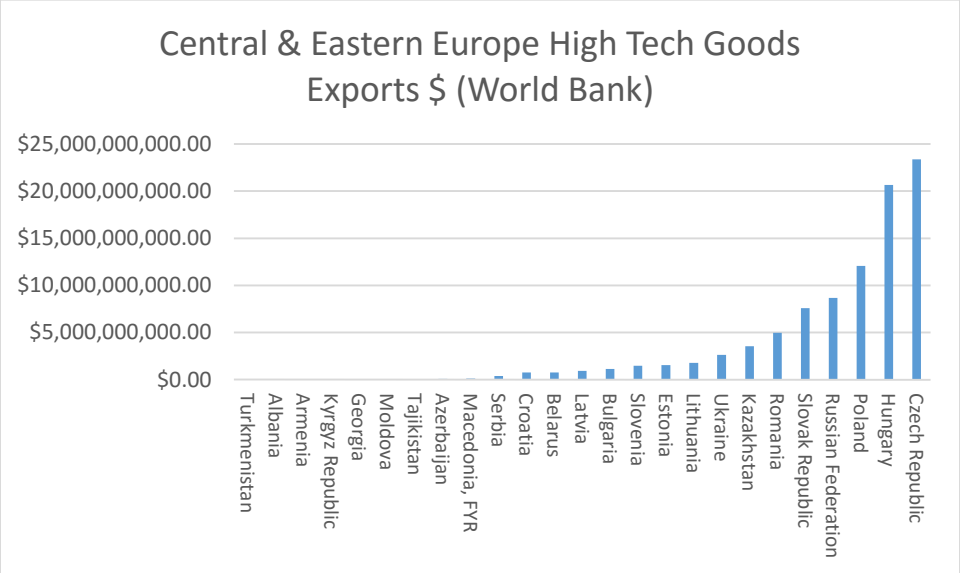
	Per Capita	Value	Market
Current	$57.52	$2.62	
Model 1	$281.01	$12.80	
Model 2	$663.24	$30.21	
Model 3	$338.31	$15.41	
Model 4	$1,515.06	$69.01	
Model 5	$2,226.15	$101.50	Czech Republic
Model 6	$801.33	$36.50	Belgium
Model 7	$1,289.59	$58.74	
Model 8	$1,000.45	$45.57	
Model 9	$1,889.82	$86.08	
Model 10	$25,115.12	$1,145.08	Singapore
Akholi Target	$2,195.42	$100.00	
		($ Billion)	

	Model Name	Description
Base	Current Ukrainian performance	5-year peak value for Ukraine.
Model 1	World Average	Average Per Capita rate of all countries globally.
Model 2	CE Regional Average (All Countries)	Average Per Capita rate of all countries within the greater Central and Eastern European region.
Model 3	Metric 2nd Quintile Average	Average Per Capita rate of countries ranking within the metric's 2nd top quintile.
Model 4	CE Region Top 5 Country Average	Average Per Capita rate of the top five metric performing countries within the Central and Eastern European region.
Model 5	CE Region Top Country Rate	Average Per Capita rate of the single top metric performing country within the Central and Eastern European region.
Model 6	13th Ranked Country Equiv. Rate	Average Per Capita rate needed to achieve the 13th largest value globally representing Ukraine's rank as the 13th largest tertiary educated labor force.
Model 7	European Union Average	Average Per Capita rate of all countries within the European Union.
Model 8	Top Tertiary Education Rate Quintile Av.	Average Per Capita rate for the metric by all countries ranked in the top Tertiary Education Rate Quintile.
Model 9	Top Metric Quintile Average	Average Per Capita rate of all countries ranked within the metric's top quintile.
Model 10	Top Metric Performer Rate	Per Capita rate of the country performing the best on a Per Capita basis to establish a theoretical metric cap.

High-Tech Goods Exports (Excluding ICT Goods)

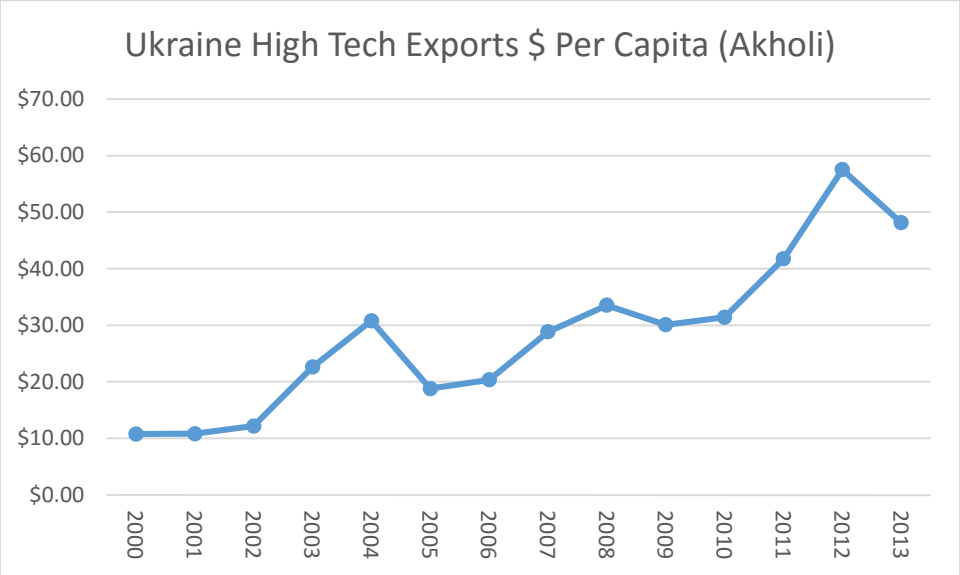


Ukraine's total High-Tech Goods Exports $ reached both a 5-year peak and all time high value of $2.6 billion in 2012. This ranks Ukraine within the second top quintile of High-Tech exporters with a global rank of #40.

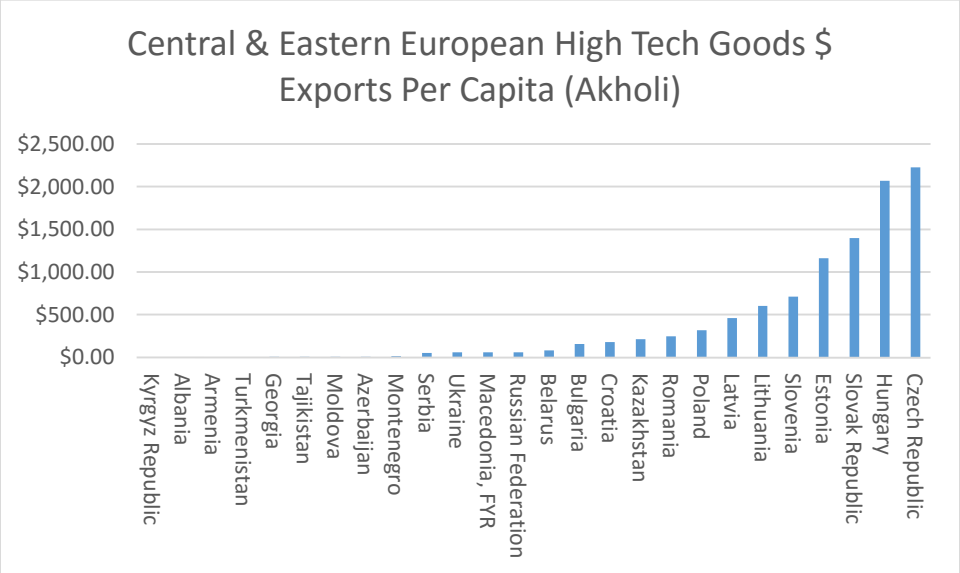


Regionally, Ukraine ranks in the top half of High-Tech Goods Exports $ although Ukraine's 5-year peak of $2.6 billion is slightly over $1 billion less than the regional average of $3.7 billion

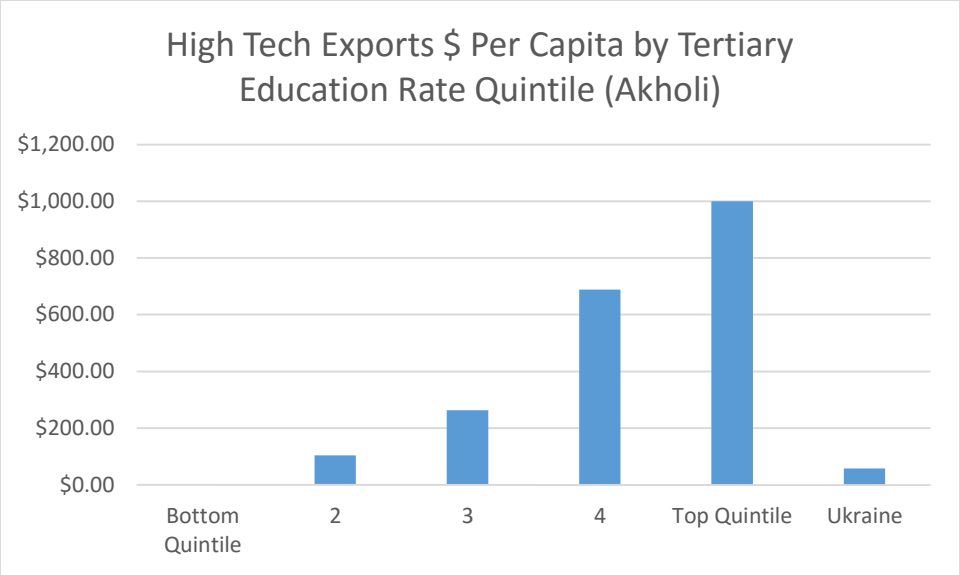
High-Tech Goods Exports $ Per Capita



Ukraine's 5-year peak and all-time best High-Tech Goods Exports $ Per Capita score of $57.52 was achieved in 2012. This score drops Ukraine's global rank to #60 dropping Ukraine to the second quintile globally.



Ukraine's 5-year peak ranks Ukraine in the bottom half within the Central and Eastern European region. The regional average High-Tech Goods Exports $ Per Capita of $662 is over $600 larger than Ukraine's 5-year peak of $57.52.



Comparing Ukraine's High-Tech Goods Exports $ Per Capita against other countries within the top Tertiary Education Rate Quintile demonstrates a sizable underperformance. Countries within the top Tertiary Education Rate Quintile average $999.44- or 17.9x Ukraine's 5-year peak of $57.52

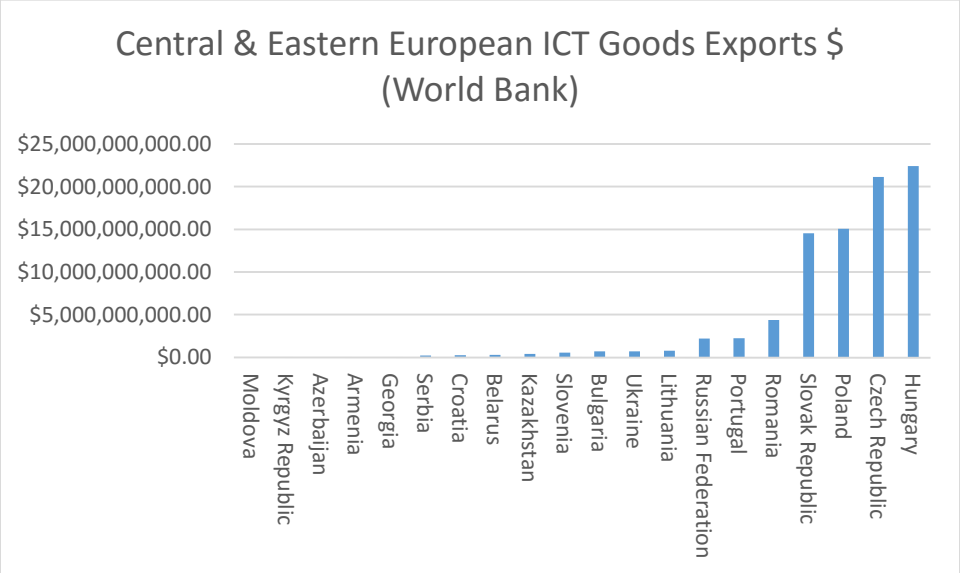
ICT Goods Exports Target Models

	Per Capita	Value	Market
Current	$15.49	$0.71	
Model 1	$253.86	$11.57	
Model 2	$762.37	$34.76	
Model 3	$721.09	$33.05	
Model 4	$1,744.36	$79.95	
Model 5	$2,682.50	$122.30	Slovak Republic
Model 6	$546.11	$25.03	France
Model 7	$611.34	$28.02	
Model 8	$1,456.14	$66.74	
Model 9	$2,394.54	$109.75	
Model 10	$29,258.96	$1,334.01	Hong Kong
Akholi Target	$2,195.42	$100.00	
		($ Billion)	

	Model Name	Description
Base	Current Ukrainian performance	5-year peak value for Ukraine.
Model 1	World Average	Average Per Capita rate of all countries globally.
Model 2	CE Regional Average (All Countries)	Average Per Capita rate of all countries within the greater Central and Eastern European region.
Model 3	Metric 2nd quintile Average	Average Per Capita rate of countries ranking within the metric's 2nd top quintile.
Model 4	CE Region Top 5 Country Average	Average Per Capita rate of the top five metric performing countries within the Central and Eastern European region.
Model 5	CE Region Top Country Rate	Average Per Capita rate of the single top metric performing country within the Central and Eastern European region.
Model 6	13th Ranked Country Equiv. Rate	Average Per Capita rate needed to achieve the 13th largest value globally representing Ukraine's rank as the 13th largest tertiary educated labor force.
Model 7	European Union Average	Average Per Capita rate of all countries within the European Union.
Model 8	Top Tertiary Education Rate Quintile Av.	Average Per Capita rate for the metric by all countries ranked in the top Tertiary Education Rate Quintile.
Model 9	Top Metric Quintile Average	Average Per Capita rate of all countries ranked within the metric's top quintile.
Model 10	Top Metric Performer Rate	Per Capita rate of the country performing the best on a Per Capita basis to establish a theoretical metric cap.

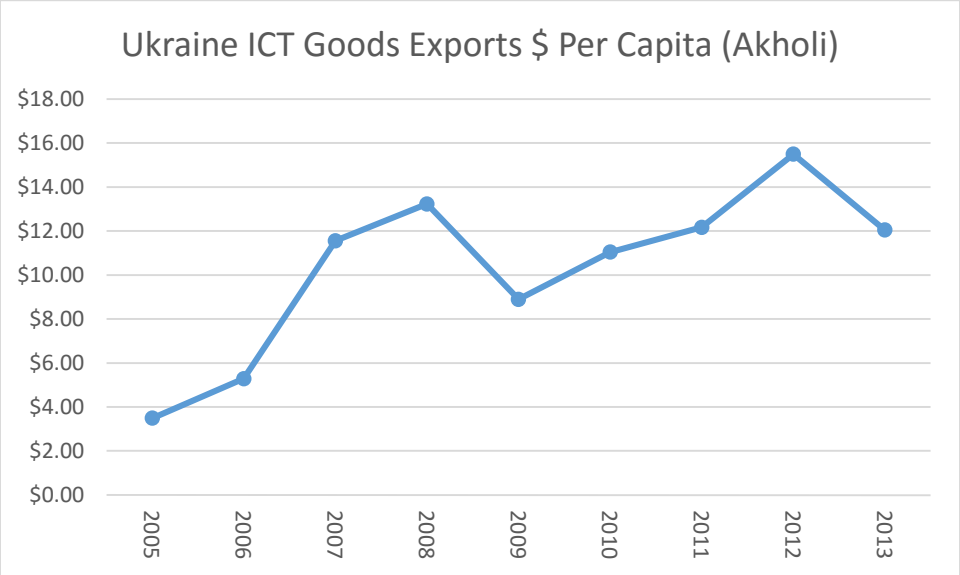
ICT Goods Exports $

Ukraine achieved a 5-year peak and all-time high ICT Goods Exports $ in 2012 with a value of $706,278,759.74 in 2012. This value ranks Ukraine #55 globally and places Ukraine within the world's second top ICT Goods Exports $ Quintile.

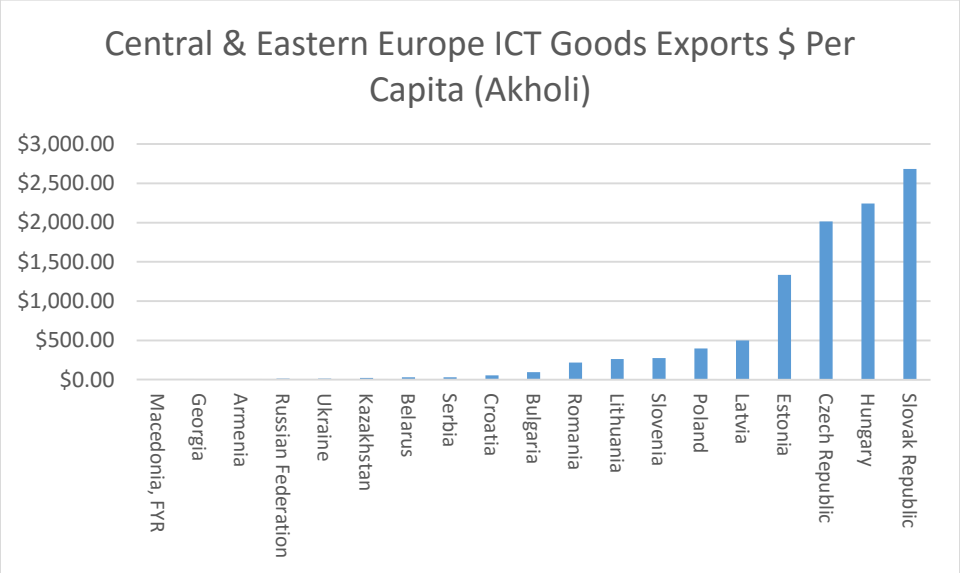


Regionally, Ukraine is in the top half of all countries in regards to total ICT Goods Exports $. However, the region's average per country of $4 billion is 5.7x larger than Ukraine's 5-year peak score of $706 million.

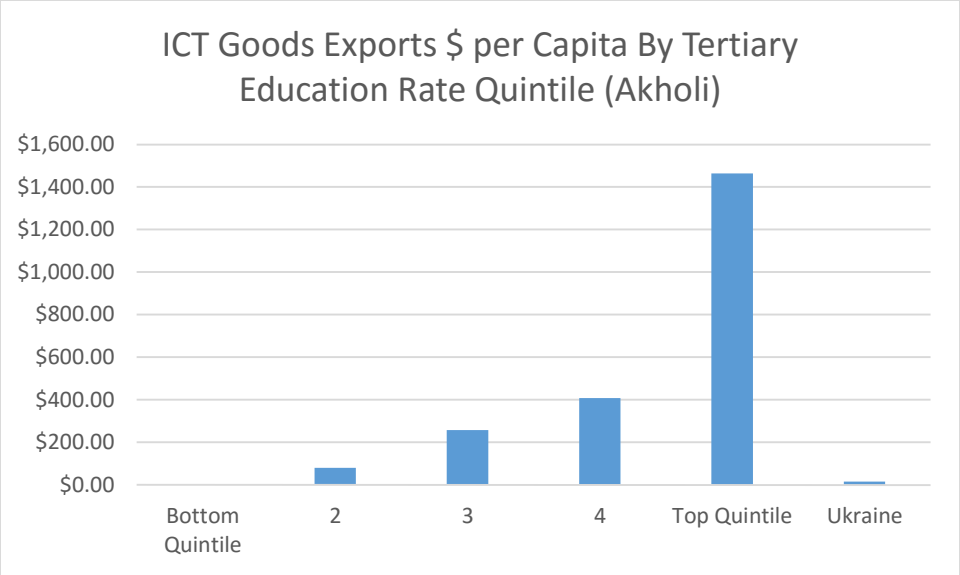
ICT Goods Exports $ Per Capita



Ukraine achieved both a 5-year peak and all-time high ICT Goods Exports $ Per Capita in 2012 with $15.49. This places Ukraine within the 3rd ICT Goods Exports $ Per Capita Quintile and ranks Ukraine #101 out of all countries assessed.

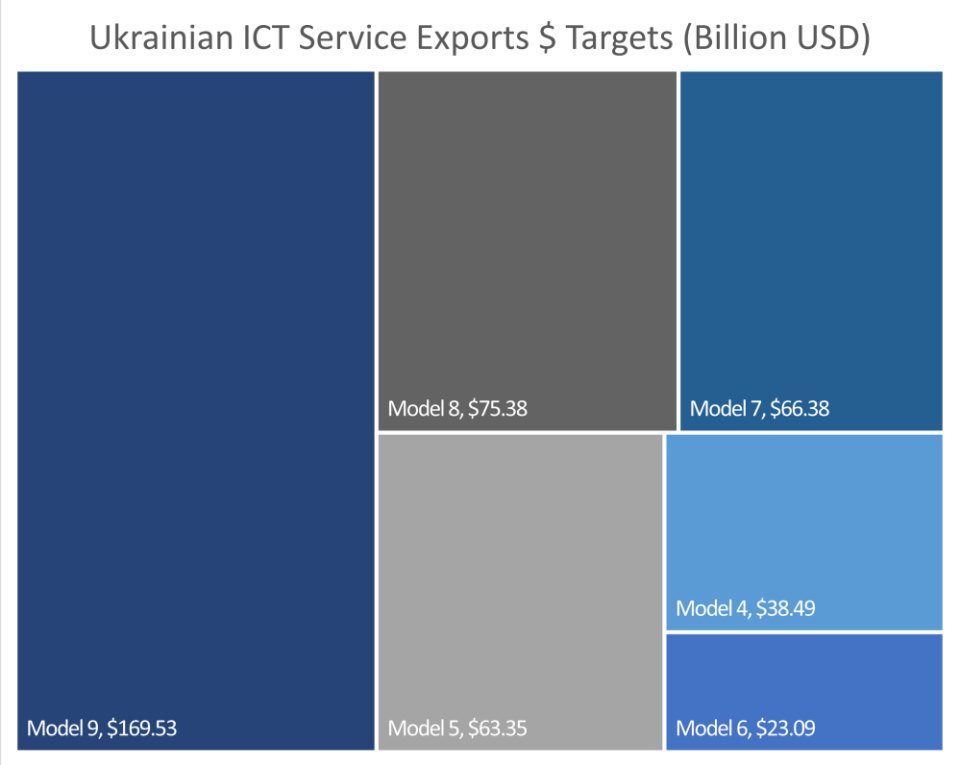


Ukraine ranks within the bottom half of all countries within the greater Central and Eastern European region in regards to ICT Goods Exports $ Per Capita. Ukraine's 5-year peak value of $15.49 is almost 50x lower than the regional average of $762.



Comparing Ukraine's ICT Goods Exports $ Per Capita against other countries within the top Tertiary Education Rate Quintile demonstrates a massive underperformance. The average ICT Goods Exports $ Per Capita of the world's top Tertiary Education Rate Quintile is $1,463.78- or 94x larger than Ukraine's 5-year peak.

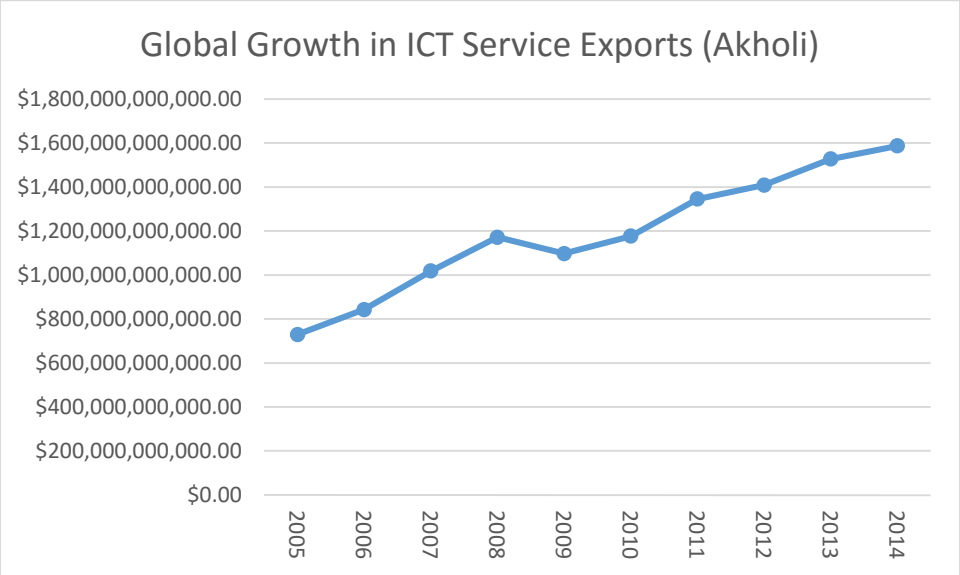
ICT Service Exports



ICT Service Exports present a significant opportunity for Ukraine immediately. As previously noted, Ukraine will have difficulty growing both High-Tech Goods and ICT Goods Exports until corruption and IP protection issues are resolved. However, there is ample evidence in the global market to support material growth in ICT Service Exports now.

Ukraine can and should make ICT Service Exports a true State initiative and top priority. No other export or segment of the economy has the same potential for immediate growth. No other export or segment of the economy can have as large of an impact on the greater economy over the short and mid-term while Ukraine continues the fight against corruption.

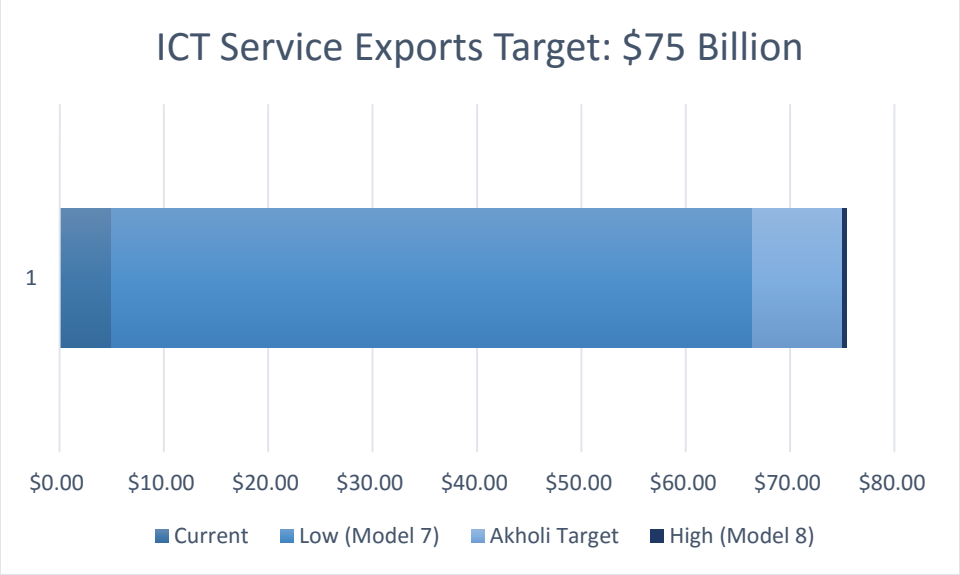
Global ICT Service Exports Growth



The ICT Service Exports industry is growing at an average rate of $85.8 billion per year over the past 10 years. This is a global growth area.

As a result of global growth (and expected ongoing growth), a tightening labor market in some of the top ICT Service Exports markets in the years ahead and Ukraine's ability to grow ICT Service Exports now, we set targets for Ukraine using higher models.

Our targets based on modeling are as follows:



ICT Service Exports $ Target Models

	Per Capita	Value	Market
Current	$110.38	$5.02	
Model 1	$218.57	$9.94	
Model 2	$481.90	$21.92	
Model 3	$428.53	$19.49	
Model 4	$846.30	$38.49	
Model 5	$1,392.58	$63.35	Estonia
Model 6	$507.69	$23.09	Singapore
Model 7	$1,459.53	$66.38	
Model 8	$1,657.41	$75.38	
Model 9	$3,727.53	$169.53	
Model 10	$37,784.88	$1,718.82	Luxembourg
Akholi Target	$1,649.06	$75.00	
		($ Billion)	

	Model Name	Description
Base	Current Ukrainian performance	5-year peak value for Ukraine.
Model 1	World Average	Average Per Capita rate of all countries globally.
Model 2	CE Regional Average (All Countries)	Average Per Capita rate of all countries within the greater Central and Eastern European region.
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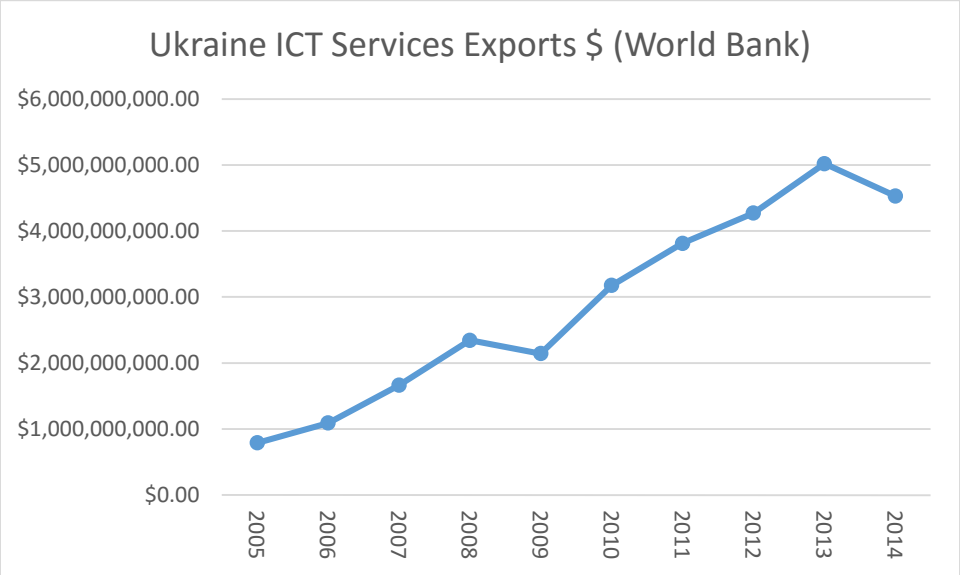
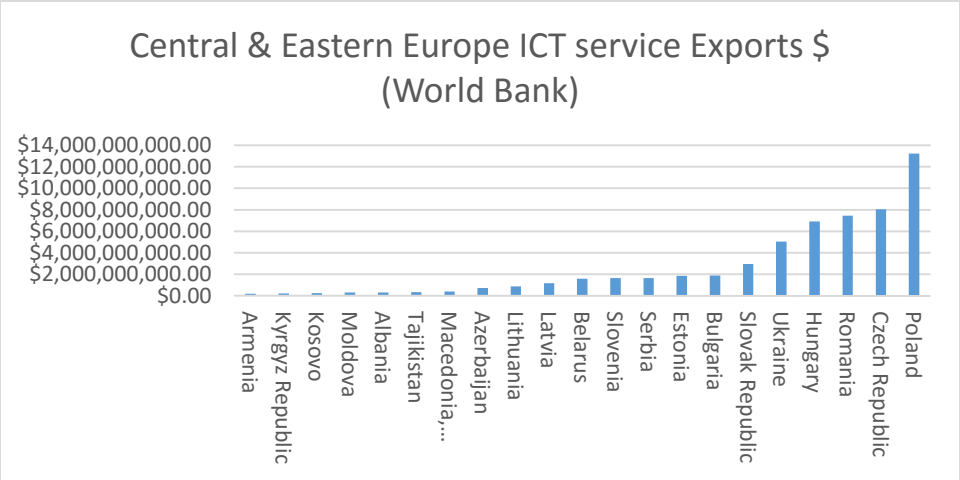
Model 10	Top Metric Performer Rate	Per Capita rate of the country performing the best on a Per Capita basis to establish a theoretical metric cap.

ICT Service Exports $

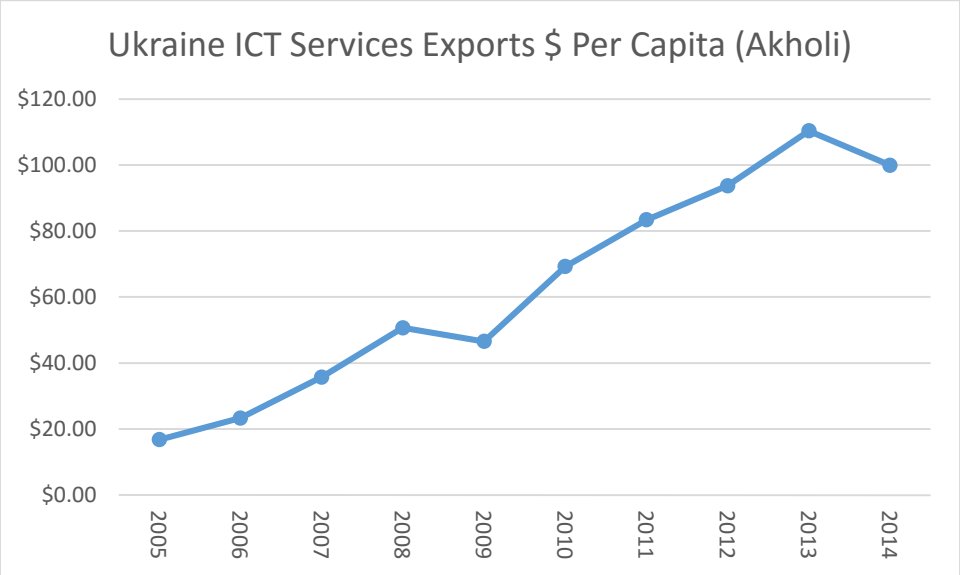


Ukraine achieved both a 5-year peak and all-time high ICT Service Exports $ rate of $5.021 billion in 2013 ranking Ukraine #43 in the world.

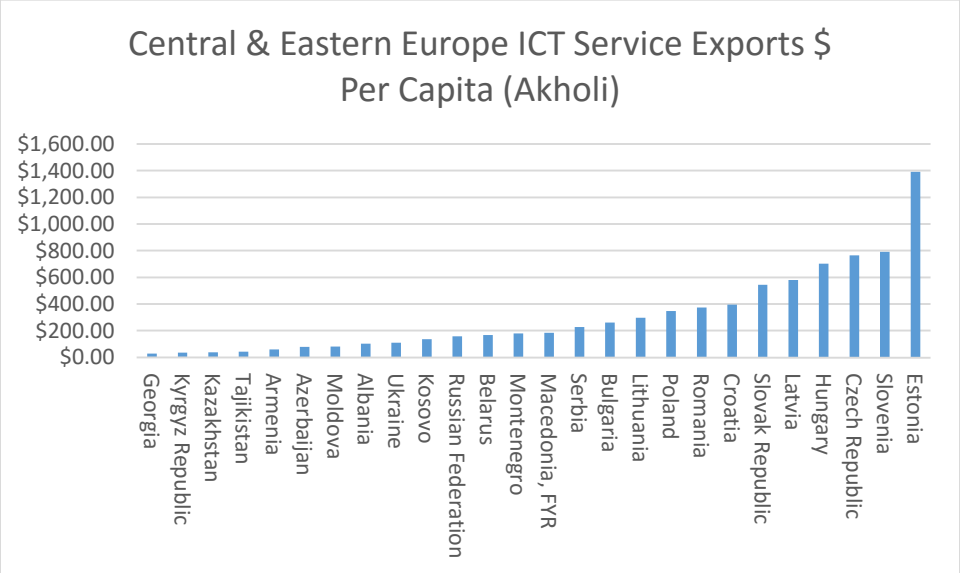


Regionally, Ukraine ranks among the top half of countries in the Central & Eastern Europe region in regards to ICT Service Exports $ although Ukraine's 5-year peak of $5.021 billion is $3.9 billion lower than the regional average of $8.9 billion.

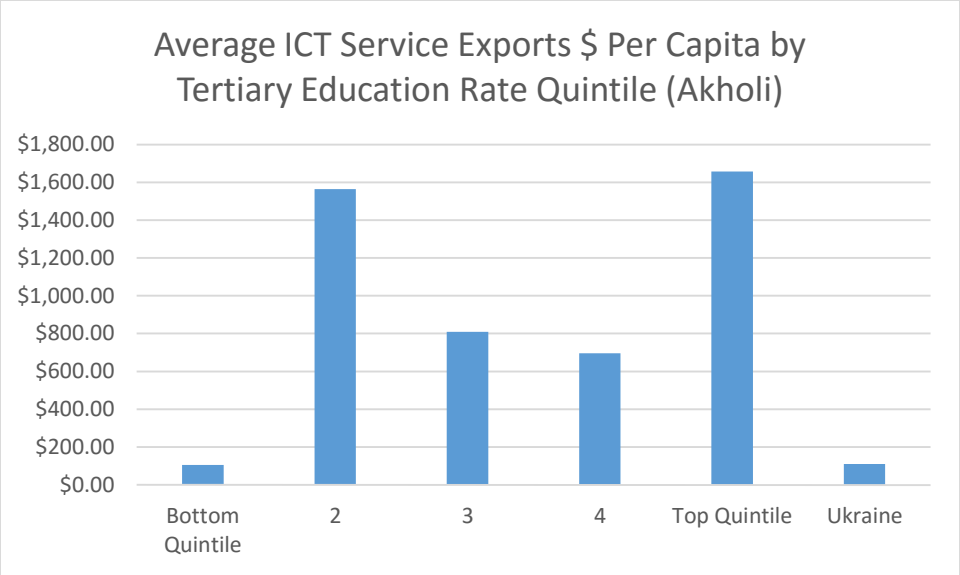
ICT Service Exports $ Per Capita



Ukraine's 5-year peak and all-time high ICT Service Exports $ Per Capita rate of $110.38 was achieved in 2013 dropping Ukraine to the 3rd ICT Service Exports $ Per Capita Quintile globally.



With a regional average of $481.90, Ukraine underperforms with Ukraine ranking in the bottom half of all regional countries. The regional average is 4.8x larger than Ukraine's 5-year peak of $110.38.



Comparing Ukraine to other countries within the top Tertiary Education Rate Quintile demonstrates Ukraine's underperformance. With an average ICT Service Exports $ Per Capita of $1,657, countries with a similar tertiary education rate to Ukraine produce an average of 15x the total ICT Service Exports $ Per Capita.

Note that this comparative model is somewhat skewed. Many countries have recognized India's economic success as a direct result of growing IT outsourcing services and have implemented programs of their own to grow the industry. While countries with low education rates and high risk due to corruption, IP protection and military conflict have massive challenges in growing technology related goods exports, many countries have been able to achieve significant success in high value and technical service exports. The model above demonstrates this trend. Several countries within the world's second lowest Tertiary Education Rate Quintile have achieved noted success and have boosted their economies.