Business Clusters in Russia

Cisco IBSG

November 2012

1 Executive Summary

"Identifying and Measuring Cluster-Driven Economic Growth in Russia" - Objectives

Purpose: To create a self-contained, chart-laden paper that can appeal to public policy practitioners and research analysts that:

1. Describes the theory of clusters
2. Examines the traits of highly successful clusters
3. Generalizes the types of economic contributions made by these successful clusters
4. Develops a framework for measuring these benefits
   a. Microeconomic – measuring the cluster-specific benefits (e.g., employment and wage gains)
   b. Macroeconomic – measuring the cluster's contribution to GDP (e.g., output, productivity, investment)
5. Examines the pre-conditions for a cluster's success
6. Predicts how "The Internet of Everything" will bolster the economic contribution of clusters.
7. Builds the case for cluster strategy in Russia
8. Evaluates Skolkovo's performance in addressing these growth parameters.

"Identifying and Measuring Cluster-Driven Economic Growth in Russia" - Objectives

Focus for today's discussion:

1. Describes the theory of clusters
2. Examines the traits of highly successful clusters through examples
3. Generalizes the types of economic contributions made by these successful clusters
4. Develops a framework for measuring these benefits
   a. Microeconomic – measuring the cluster-specific benefits (e.g., employment and wage gains)
   b. Macroeconomic – measuring the cluster's contribution to GDP (e.g., output, productivity, investment)
5. Examines the pre-conditions for a cluster's success
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Executive summary – 1 of 3

1. Clusters as an Accelerator of Economic Growth – With the current economic growth challenges of the global economy, and the shrinking ability of either fiscal or monetary policy to addresses these challenges, the development and growth of clusters presents an attractive alternative way of using a economy's internal resources.

2. Clusters and GDP Growth - Looking at the sources of GDP growth using a resource framework, multi-factor productivity (MFP) emerges as one of the key drivers of growth in developed countries. This view of GDP is important because clusters are particularly adept as driving MFP-led growth.

3. What are the Economic Benefits of a Cluster? – Through agglomeration and proximity benefits, clusters can stimulate productivity growth and employment, drive innovation, and facilitate the commercialization of new products and encourage new business formation.

4. A Cluster Taxonomy and How Clusters Create Value – After analyzing many examples of successful clusters, a common set of cluster strategy and focus attributes becomes apparent.

5. How Can the Economic Benefits be Measured? An Example Framework. (*Microeconomic*) – Using the U.S. information industry as a proxy, we can look at a cluster's distribution of firms by employment size and industry, and predict the number of new jobs the cluster creates.

Executive summary – 2 of 3

6. How Can the Economic Benefits be Measured? An Example Framework. (*Macroeconomic*) – Once the number of new jobs emanating from a cluster has been estimated, other macroeconomic benefits can be measured, such as wage growth, investment and productivity gains, spillover effects outside the cluster, and multiplier effects with the remainder of the economy. Distinctions need to be made about how much value a cluster adds to a national economy, and how much annual incremental growth a cluster adds.

7. What is the Critical Mass Necessary for a Cluster to be Successful? In order to be successful, a cluster must create a compelling value framework to attract and develop members. For a cluster to succeed, the value-added must be greater than a firm's additional costs of either moving to or operating within a cluster. This value added can be either direct, such as through reduced building rents or transportation costs, or indirect, such as through a cluster's quality reputation, or by collaborating with experts, perhaps in other companies at a coffee shop.

8. By 2020, The Internet-of-Everything Will Magnify the Benefits of a Cluster - By enhancing the number and importance of collaboration between people, places, things and machines, the Internet-of-Everything will enhance the appeal of a cluster by providing a focal point for firms to understand and harness the most significant of these potential additional benefits.

Executive summary – 3 of 3

9. The Role of Clusters in Russia's Macro-economy (1) – Recent World Economic Forum (WEF) data suggests that a sizable amount of potential economic growth exists in Russia due to its size and resource potential. But a lack of business sophistication, innovation potential and market efficiencies are views as impediments to global competitiveness. A systematic, national cluster-strategy can directly address these shortcomings.

10. The Role of Clusters in Russia's Macro-economy (2) - A separate analysis of macroeconomic data shows that Russia's services sector is relatively small compared with the services areas in the U.S. and Europe. This, too, can be a focus of Russia's national cluster strategy as most clusters center around technology or information issues.

11. An Assessment of the Skolkovo Cluster and a broader National Cluster Strategy – (possible)

“Identifying and Measuring Cluster-Driven Economic Growth in Russia” – Research Plans

For January:

- Completion of paper as outlined in Executive Summary
  - Comparison of Skolkovo cluster economic success comparison with peers
  - Recommendations for plans to capture “Internet-of-Everything” benefits
- Development of cluster economic growth model based on Skolkovo input
  - Analysis of impact of Skolkovo data contributions
  - Review of model prototype

2 Slides for workshop

Clusters as an accelerator of economic growth.

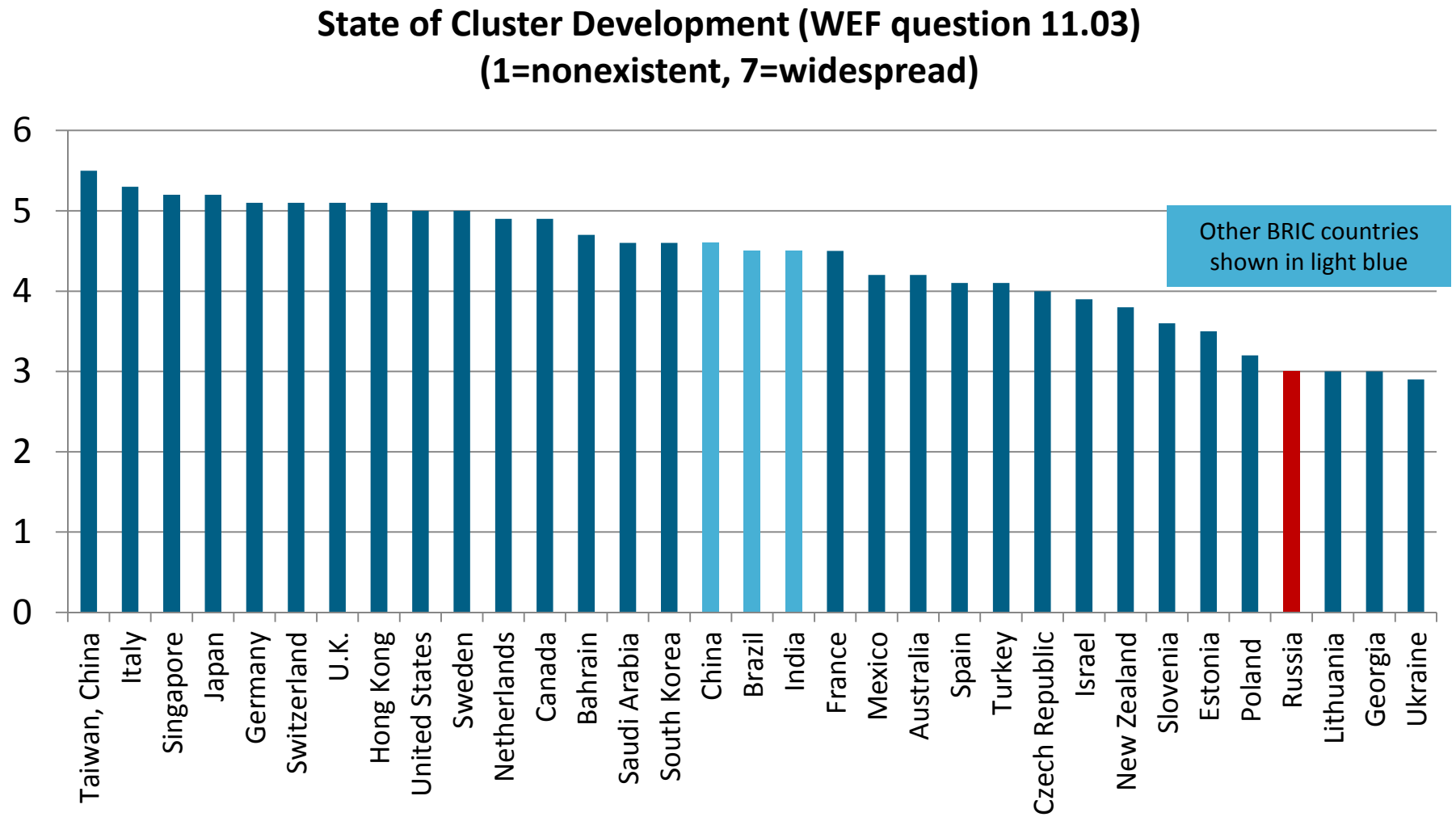
- Cluster definition from Michael Porter:
  "Geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions that compete but also collaborate."

- Orientation around focal points allows for precise targeting of benefits

- Allows for creation of public policy to offset weaknesses in macroeconomic growth
  - Shrinking labor force
  - Natural resource shortages
  - Weakness in innovation-intensive areas (services sectors)
  - Competing in global markets

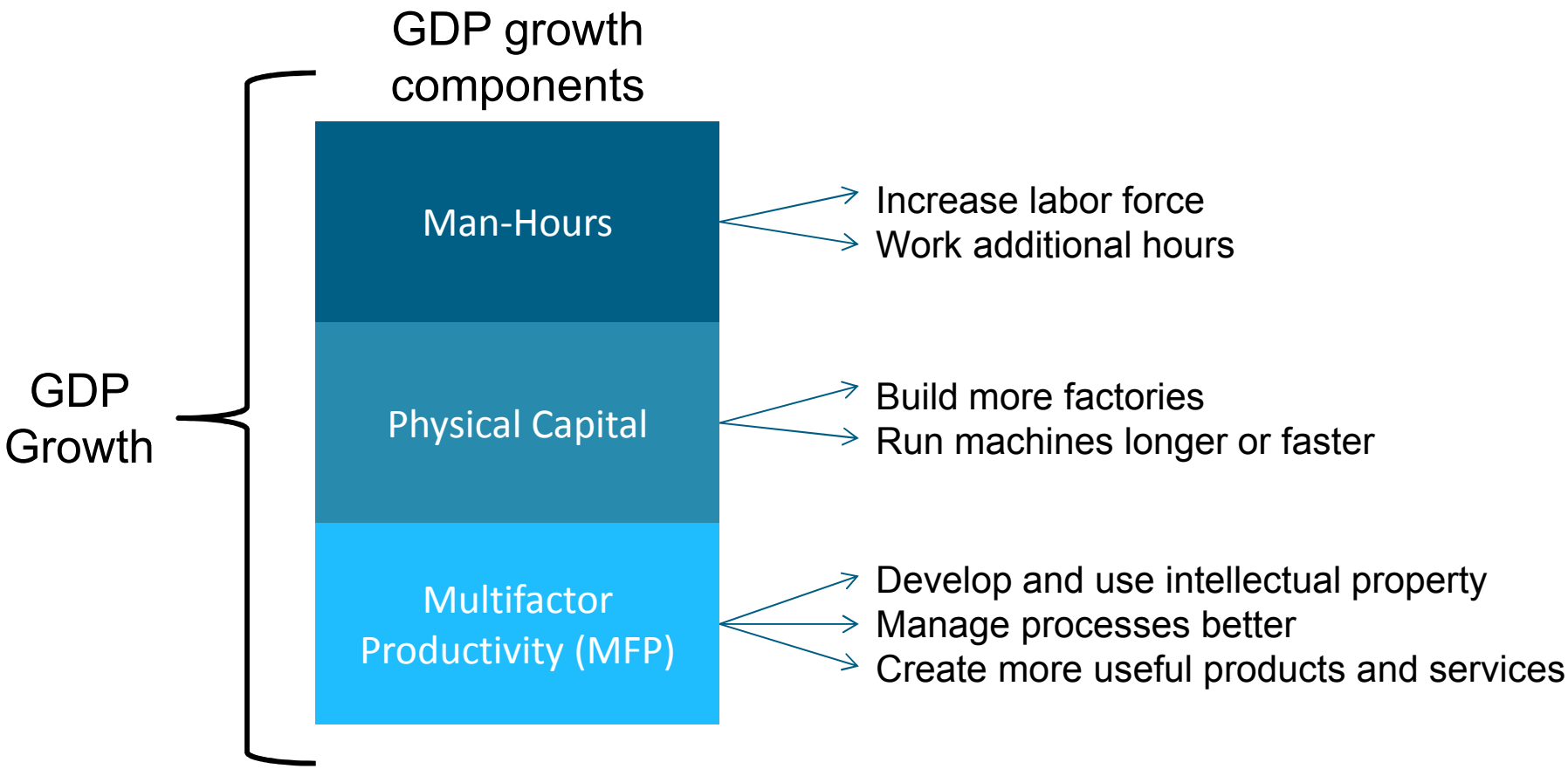
Sources: Cisco IBSG

Russia lags with respect to its development of economic clusters.



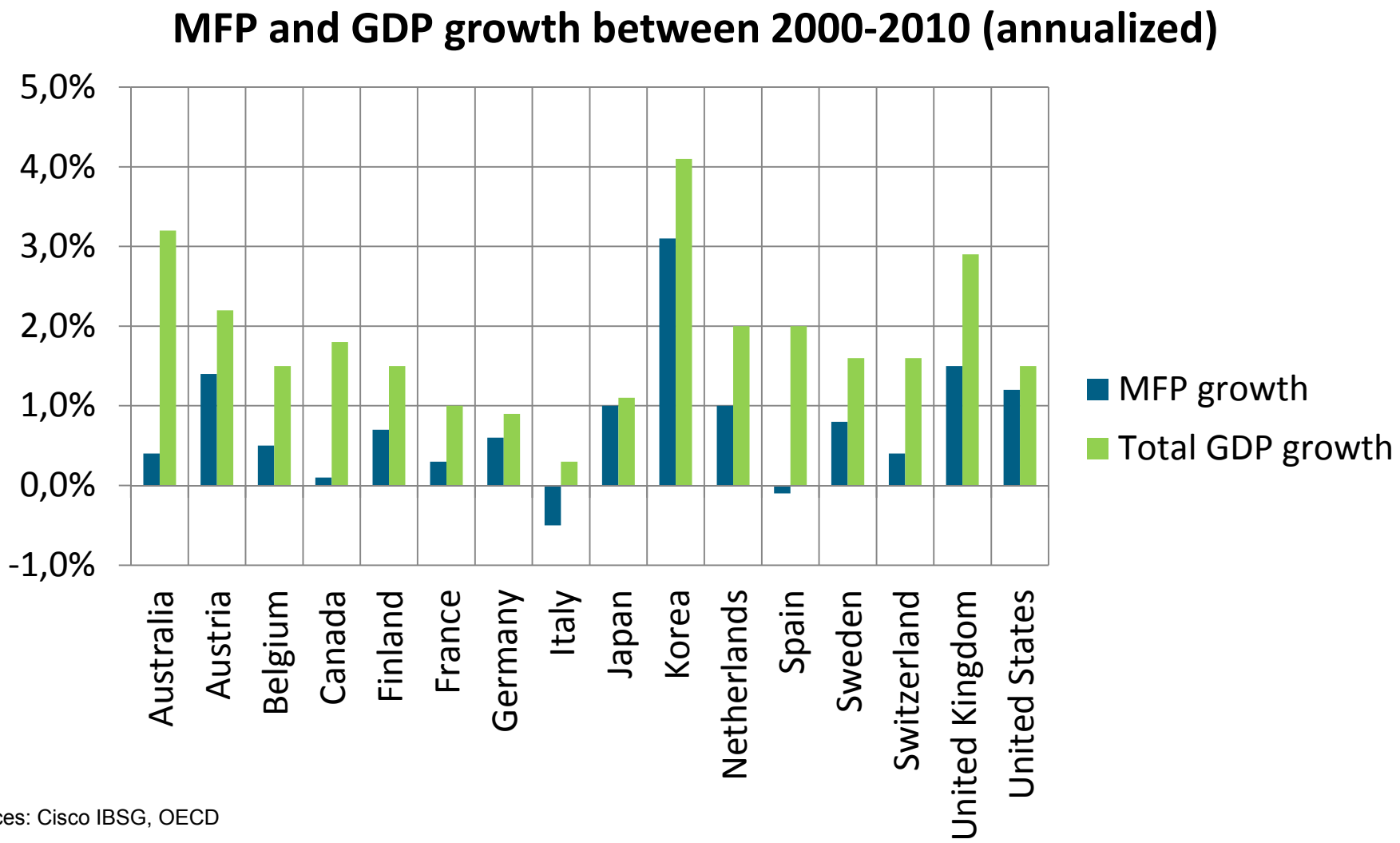
Source: World Economic Forum Global Competitiveness Report (selected countries)

Sources of GDP growth include more than man-hours or physical assets.



Sources: IBSG

Multi-factor productivity (MFP) contributes substantially to overall GDP growth.

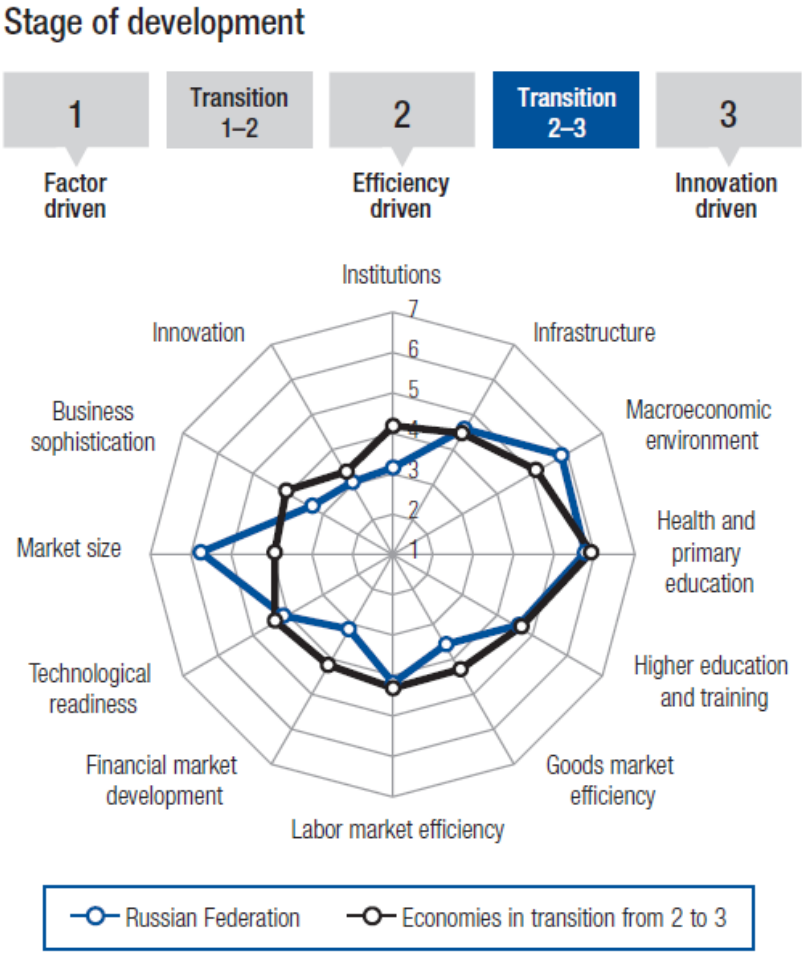


Sources: Cisco IBSG, OECD

Russia's size and macroeconomic environment are very favorable, but the level of innovation and institutional efficiency lags.

The Global Competitiveness Index

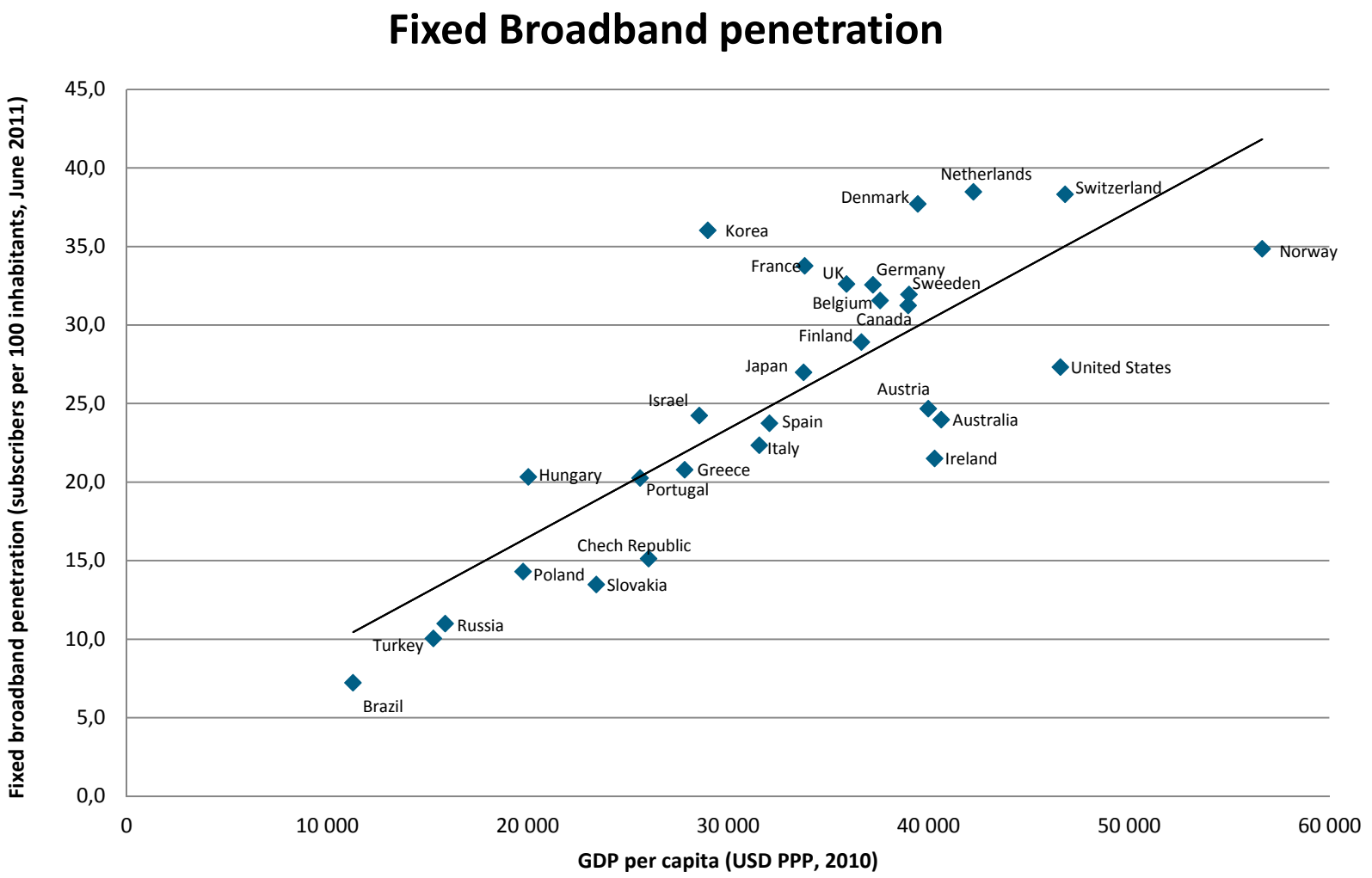
	Rank (out of 144)	Score (1–7)
GCI 2012–2013	**67**	**4.2**
GCI 2011–2012 (out of 142)	66	4.2
GCI 2010–2011 (out of 139)	63	4.2
Basic requirements (30.0%)	**53**	**4.8**
Institutions	133	3.1
Infrastructure	47	4.5
Macroeconomic environment	22	5.8
Health and primary education	65	5.7
Efficiency enhancers (50.0%)	**54**	**4.3**
Higher education and training	52	4.6
Goods market efficiency	134	3.6
Labor market efficiency	84	4.2
Financial market development	130	3.2
Technological readiness	57	4.1
Market size	7	5.8
Innovation and sophistication factors (20.0%)	**108**	**3.2**
Business sophistication	119	3.3
Innovation	85	3.0



Source: World Economic Forum Global Competitive Report

Per capital GDP between $9k-$17k

Broadband penetration inevitably leads to overall GDP per capita increase



Russia's cluster strategy can impact the Business Sophistication and Innovation pillars, but other economic changes also need to be made.

		WEF metrics (7=world class, 1=very poor)							
WEF Pillars	*WEF Category*	Russia	Brazil	India	China	Mexico	Poland	Turkey	Best in Class
Institutions	Basic Requirements	3.1	3.8	3.9	4.2	3.6	4.1	4.0	6.1, Singapore
Infrastructure	Basic Requirements	4.5	4.0	3.6	4.5	4.0	3.9	4.4	6.7, Hong Kong
Macroeconomic environment	Basic Requirements	5.8	4.7	4.3	6.2	5.2	4.6	4.9	7.0, Brunei
Health and primary education	Basic Requirements	5.8	5.4	5.3	6.1	5.7	6.0	5.8	6.8, Finland
Higher education and training	Efficiency Enhancers	4.6	4.3	4.0	4.3	4.1	4.9	4.2	6.2, Finland
Goods market efficiency	Efficiency Enhancers	3.6	3.9	4.2	4.3	4.2	4.4	4.6	5.6, Singapore
Labor market efficiency	Efficiency Enhancers	4.2	4.4	4.2	4.6	4.0	4.5	3.8	5.9, Switzerland
Financial market development	Efficiency Enhancers	3.1	4.5	4.9	4.3	4.2	4.6	4.5	5.9, Hong Kong
Technological readiness	Efficiency Enhancers	4.1	4.4	3.4	3.5	3.8	4.7	4.3	6.3, Sweden
Market size	Efficiency Enhancers	5.8	5.6	6.2	6.8	5.6	5.1	5.3	6.9, United States
Business sophistication	Innovation and Sophistication	3.3	4.5	4.3	4.3	4.3	4.1	4.3	5.8, Japan
Innovation	Innovation and Sophistication	3.0	3.4	3.6	3.9	3.3	3.3	3.3	5.8, Switzerland

Source: World Economic Forum Global Competitive Report

Additional detail in Figures 16-17

Comparison of key cluster-related competitiveness benchmarks – Business Sophistication

Business sophistication pillars	*Metric*		Russia	Brazil	India	China	Mexico	Poland	Turkey		Best in Class
Local supplier quantity	1=virtually nonexistent 7=very numerous		4.0	5.5	5.6	5.2	5.0	5.3	5.1		6.2, Japan
Local supplier quality	1=very poor 7=very good		3.8	5.0	4.5	4.5	5.0	4.8	4.7		6.2, Switzerland
State of cluster development	1=largely nonexistent 7=very numerous		3.0	4.5	4.5	4.5	4.2	3.2	4.1		5.5, Taiwan
Nature of competitive advantage (in international markets)	1=low-cost or natural resources 7=unique products		2.7	3.1	3.4	3.6	3.5	3.2	3.2		6.4, Switzerland
Value chain breadth	1=narrow, involved in individual steps of value chain 7=broad, presence across all of value change		2.8	3.8	4.1	3.8	4.2	3.8	4.1		6.1, Germany
Control of international distribution	1=control through largely foreign companies 7=extensive control through largely domestic companies		3.5	4.4	4.2	4.3	4.1	3.9	4.6		5.6, Japan
Production process sophistication	1=labor intensive methods, old technologies 7=world's best and most efficient processes		3.1	4.7	4.1	3.9	4.3	4.1	4.4		6.6, Japan
Extent of marketing	1=very little 7=extensive		3.5	5.2	4.4	4.4	4.4	4.3	4.7		6.2, U.K.

Source: World Economic Forum Global Competitive Report

Comparison of key cluster-related competitiveness benchmarks - Innovation

Innovation pillars	*Metric*		Russia	Brazil	India	China	Mexico	Poland	Turkey		Best in Class
Capacity for innovation	1=licenses or imitate foreign companies 7=formal research and pioneering new products and processes		3.3	3.7	3.5	4.1	3.1	3.3	3.4		5.9, Japan
Quality of scientific research institutions	1=very poor 7=best in field internationally		3.6	4.1	4.4	4.2	4.0	4.1	3.4		6.9, Israel
Company spending on R&D	1=nearly no spending 7=spends heavily		3.0	3.6	3.5	4.1	3.2	2.9	3.2		5.9, Switzerland
University-industry collaboration in R&D	1=no collaboration 7=collaborates extensively		3.4	4.1	3.8	4.4	4.1	3.6	3.6		5.9, Switzerland
Government procurement of advanced technology products	1=nearly none 7=extensively and effectively		2.9	3.8	3.4	4.4	3.6	3.2	4.0		5.8, Qatar
Availability of scientists and engineers	1=not at all 7=widely available		3.8	3.5	5.0	4.4	4.0	4.2	4.5		6.2, Finland
Patent applications	Per million population		5.4	2.8	1.2	6.5	1.6	5.8	5.8		311.0, Sweden

Source: World Economic Forum Global Competitive Report

A cluster taxonomy (neither exclusive nor exhaustive)

- Organic cluster - Aggregation of SMB, facilities, financial services and other added-value services, in a space already highly talented and economically dynamic
- University-based cluster - Clusters developed around the research center of the university, with small spaces, a limited number of buildings, focused on advanced innovation
- Local government led cluster- Clusters benefiting from large spaces, involving several towns or territories in order to achieve a critical mass and impact local development
- Private sector led cluster - Joint partnership parks or developer initiative parks, on a medium-size territory built by developers as primarily real estate development projects
- Technology-based clusters - Clusters creating a source of competitive differential by development new technologies or by virtue of access to a proprietary network or technology. May be tied to a specific geography or virtual.
- Government / business / academic partnerships - Clusters benefiting from large spaces, designed to enhance national, regional and local competitiveness all together. A mix of SMB & innovative start ups

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Sources: Cisco IBSG

Applying U.S. information industry results (2010) to estimate cluster employment growth.

Enterprise Size (number of employees)	Hypothetical mix of firms in 500 firm cluster	Hypothetical cluster employ-ment	% of existing firms that expanded	Average number of new employees	Total gross employ-ment gain	Start-up rate (% of firm population)	# start ups	Employ-ment per start-up	Employ-ment from start-ups	Total employment gains from expanding firms and start-ups
1-4	200	2.0	14.9%	2.2	67	17.1%	34	1.7	58	125
5-9	150	6.6	24.8%	2.8	104	6.2%	9	6.5	60	165
10-19	75	12.9	29.0%	3.7	81	4.6%	3	12.5	43	124
20-99	50	30.5	28.8%	6.7	97	3.5%	2	28.5	50	147
100-499	20	125.0	25.8%	12.4	64	n.a.	n.a.	n.a.	n.a.	n.a.
500+	5	650.0	21.3%	4.6	5	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL	500	9,622	18.4%		418		99		211	630

Results: A cluster with 500 firms and nearly 10,000 employees can expect its employment to grow 6.5% (630 / 9,622) in a year with moderate macro-economic growth.

Sources: Cisco IBSG

Errors may exist due to rounding.

There are many types of clusters, each with their own strengths and weaknesses.

	Organic cluster	University-based cluster	Local government led cluster	Private sector led cluster	Technology-based clusters	Government / business / academic partnerships
WW best-practices	Silicon Valley (US) Boston innovation center (US)	Cambridge Science Park (UK) MIT (US)	Sophia-Antipolis (Fr) Hsinshu (Taiwan) Songdo / Incheon (Ko) Minalogic (France)	Japanese Clusters Birmingham Science Park (UK)	Google-led high speed geographical areas (US)	Skolkovo (Ru) Nice Eco-Valley (Fr)
Criteria	Aggregation of SMB, facilities, financial services and other added-value services, in a space already highly talented and economically dynamic	Clusters developed around the research center of the university, with small spaces, a limited number of buildings, focused on advanced innovation	Clusters benefiting from large spaces, involving several towns or territories in order to achieve a critical mass and impact local development	Joint partnership parks or developer initiative parks, on a medium-size territory built by developers as primarily real estate development projects	Clusters creating a source of competitive differential by development new technologies or by virtue of access to a proprietary network or technology. May be tied to a specific geography or virtual.	Clusters benefiting from large spaces, designed to enhance national, regional and local competitiveness all together. A mix of SMB & innovative start ups
Governance	No governance	PPP promoted by a dynamic academic team, trying to standardize and industrialize such partnerships at a larger scale. The university owns and operates the structure.	Local entity put in place by local decision-makers. A local agency owns and operate the structure, trying to foster PPP partnership, and specifically designed alliances with the university.	For-profit parks or non-profit park, with clear business model and performance indicators. No public grants or only limited public grants when the place has been identified as a target for vitalizing or revitalizing regional dev.	Led either by a local development authority or the initiating company.	Independent entity put in place by the government, with national and local representatives, sometimes private representatives. A foundation or a national agency owns and operates the structure.
Strengths	Success brings success : virtuous cycle of collaborations, international connections and partnershipss	Natural concentration of talents Technology incubation Joint research on well identified topics International recognition	Strong leadership Desirable location All infrastructures Collaboration machine	Highly desirable location All infrastructures Excellent marketing International perspective Global thinking	Well-defined economic benefit to the clusters' participants.	Strong leadership Desirable living location All infrastructures = huge accessibility of all kinds Collaboration machine International reference
Weaknesses	No governance structure to boost the system or support it in economic down turns	Small space University-centric governance vs collaborations	Development limited at the regional level	Real-estate focused projects, high land price and building rent Risk of keeping innovation aside	May create economic distortions by encouraging separation of cluster members from other assets of productions.	Governance and project Complexity

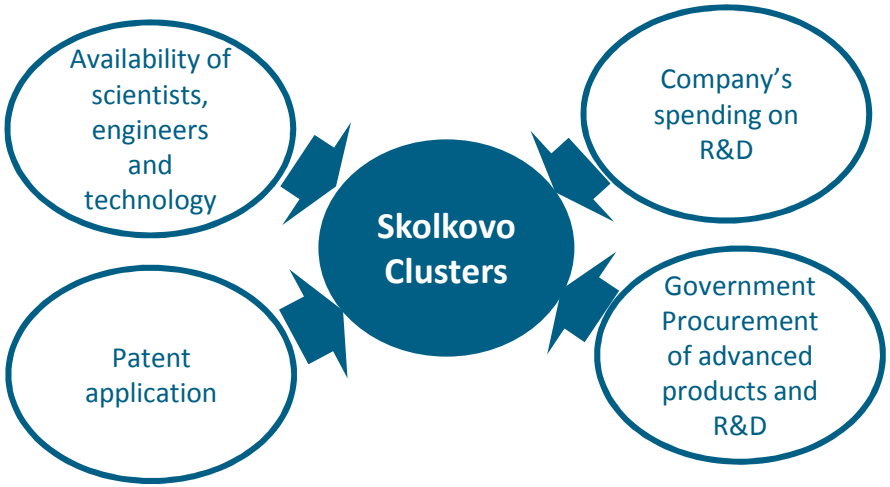
Source: Cisco IBSG

Skolkovo's clusters are well positioned to generate further development.

Draft Version

- Problem affecting Russian R&D is that a large portion of the equipment used by researchers is old; 25% is more than 10 years old and more than 12% is more than 20 years old, according to HSE Research.
- The average age of Russia's researchers is 49 years, with 40% over 55 years old. The number of researchers 70 years old has also doubled in the past six years, while the number under 30 has risen 18%.
- Russia needs to promote Science among youngsters and create favorable conditions for scientists and University staff.

- Patents application in Russia (2010), non-residents: 13,778 (CAGR 4,97% over last 4 years), USA: 248,249;
- Patents applications in Russia (2010), residents: 28,722 (CAGR 1.45% over last 4 years), USA: 241,977
- Russia Trademark applications, direct resident (2010): 32,735, USA: 236,826

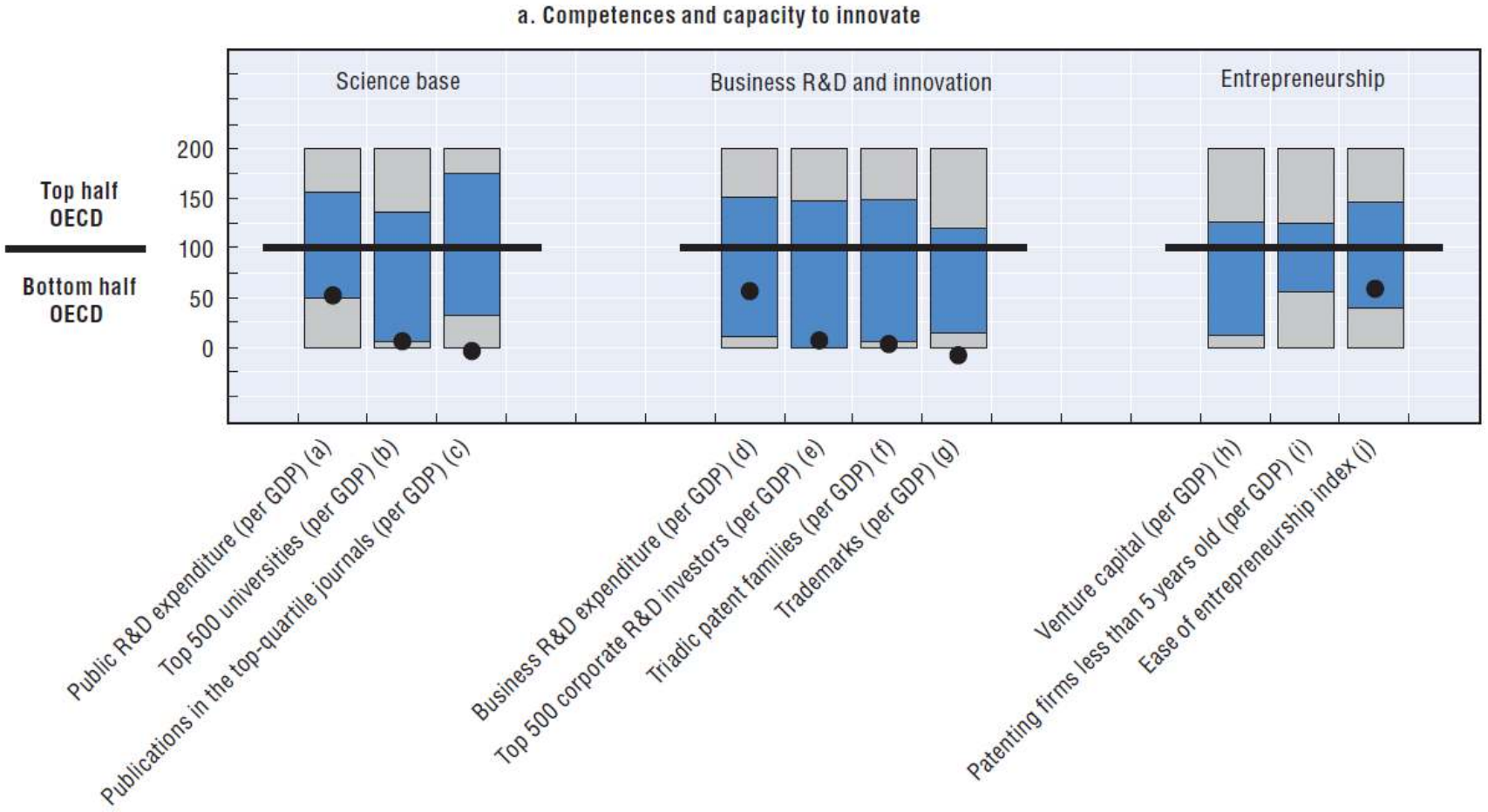


- Russian Enterprises contribute 1% of GDP on R&D purposes
- R&D personnel (HC) as a percentage of persons employed: 1.04% , Compared to Finland 3.1%, UK: 1.73%

- Generally the volume of government procurement in developed countries amounts 10—15% GDP , in Russia it's 6-8% with high growth potential.
- Russia contributes 2% to the world's gross domestic expenditure on R&D (GERD) (comparing to United State 32.6% and Japan 12.9%).
- Government 's spending on R&D amounts 0.51 % (comparing to U.S 0.99%, UK 0.73%, Israel 1.05%)
- Nearly 60% of Russia's 1,134 universities being government operated. Seven new large federal universities are now planned to become key educational centers for macro-regions across Russia. However, academia contributes less than 7% to the national GERD, about half the level of that in the U.S.

Source: Cisco IBSG

Comparative performance of national science and innovation systems shows that these days Russia lags behind OECD countries



In terms of Interactions and human resources for innovation Russia demonstrates a modest performance compared to OECD countries