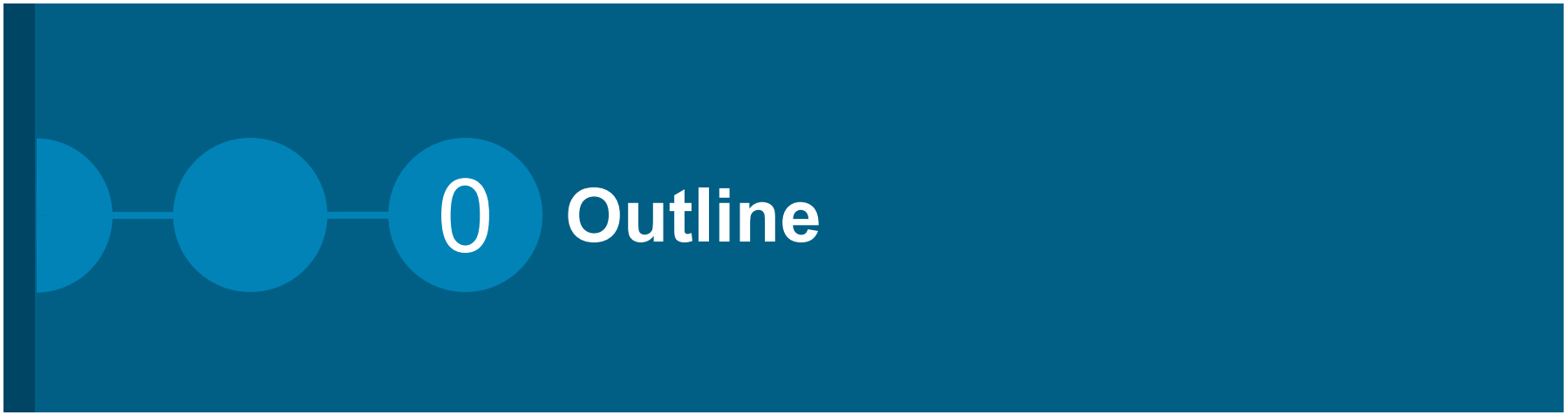
Using Clusters to Unleash Economic Growth in Russia

Cisco IBSG

February 2013



Using Clusters to Unleash Economic Growth in Russia - Objectives

1. Describe the theory of clusters and their contributions to economic growth
2. Examine the traits of highly successful clusters
3. Examine current economic conditions in Russia, and why cluster development makes good economic policy
4. Explain how “The Internet of Everything” will bolster the economic contribution of clusters; identify implications for Skolkovo growth areas
5. Modeling Skolkovo’s economic contributions (develop a framework for measuring cluster-specific economic benefits
6. Make strategic recommendations to accelerate Skolkovo’s growth and scale Skolkovo’s success to other areas of Russia.

Executive Summary

- Russia's overall economic growth is strong compared with the U.S. and Western Europe, with no significant debt or trade imbalances.
- Russia's greatest challenge will be to continue this growth with a shrinking and aging labor force.
- In recent years, Russia's services sectors have contributed a lion's share of economic growth.
- The size of the services sectors remains relatively small compared with the U.S. and Western Europe, suggesting that there remains much more room for growth. Expanding these sectors may extend the time that employees can remain the labor force.
- Russia's inbound foreign direct investment is proportionally comparable to China, a very closed economy.
- Russia's country risk scores, used by multinational investment decision makers, is low, especially in the operational and security risk categories.
- A culture of R&D spending does not exist in Russia.
- Russia's WEF scores suggest much potential economic growth exists due to Russia's size and resource potential, but a lack of business sophistication, innovation potential and market efficiencies are views as impediments to global competitiveness.
- Russia also lags most other peer countries with the extent of business clustering that exists, suggesting that this is one way that many of these impediments can be overcome.

1 The theory of clusters, and their contributions to economic growth

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."

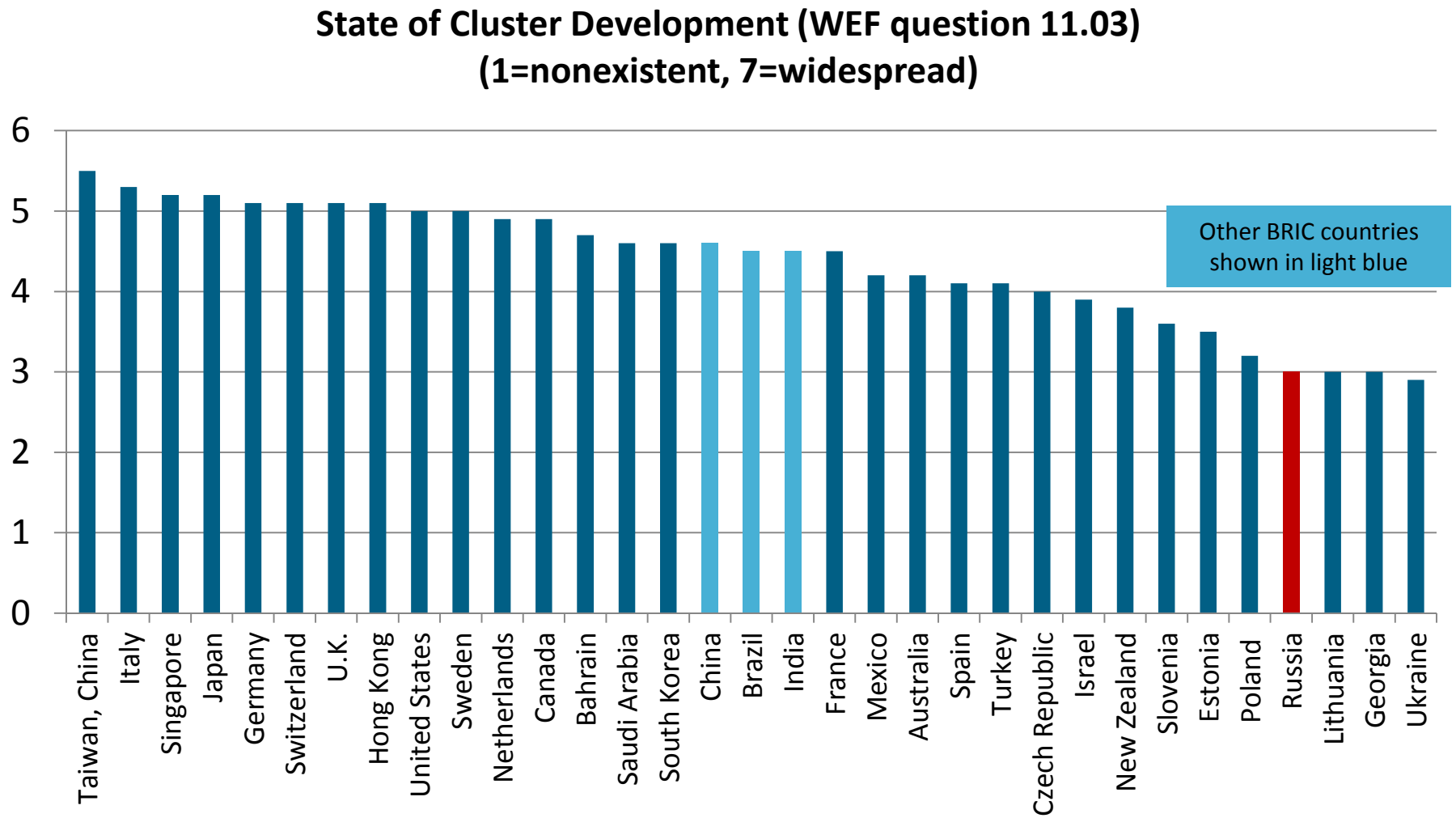
- Orientation around focal points allows for precise targeting of benefits

- 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

- Spurs multi-factor productivity – a key source of economic growth in most developed countries

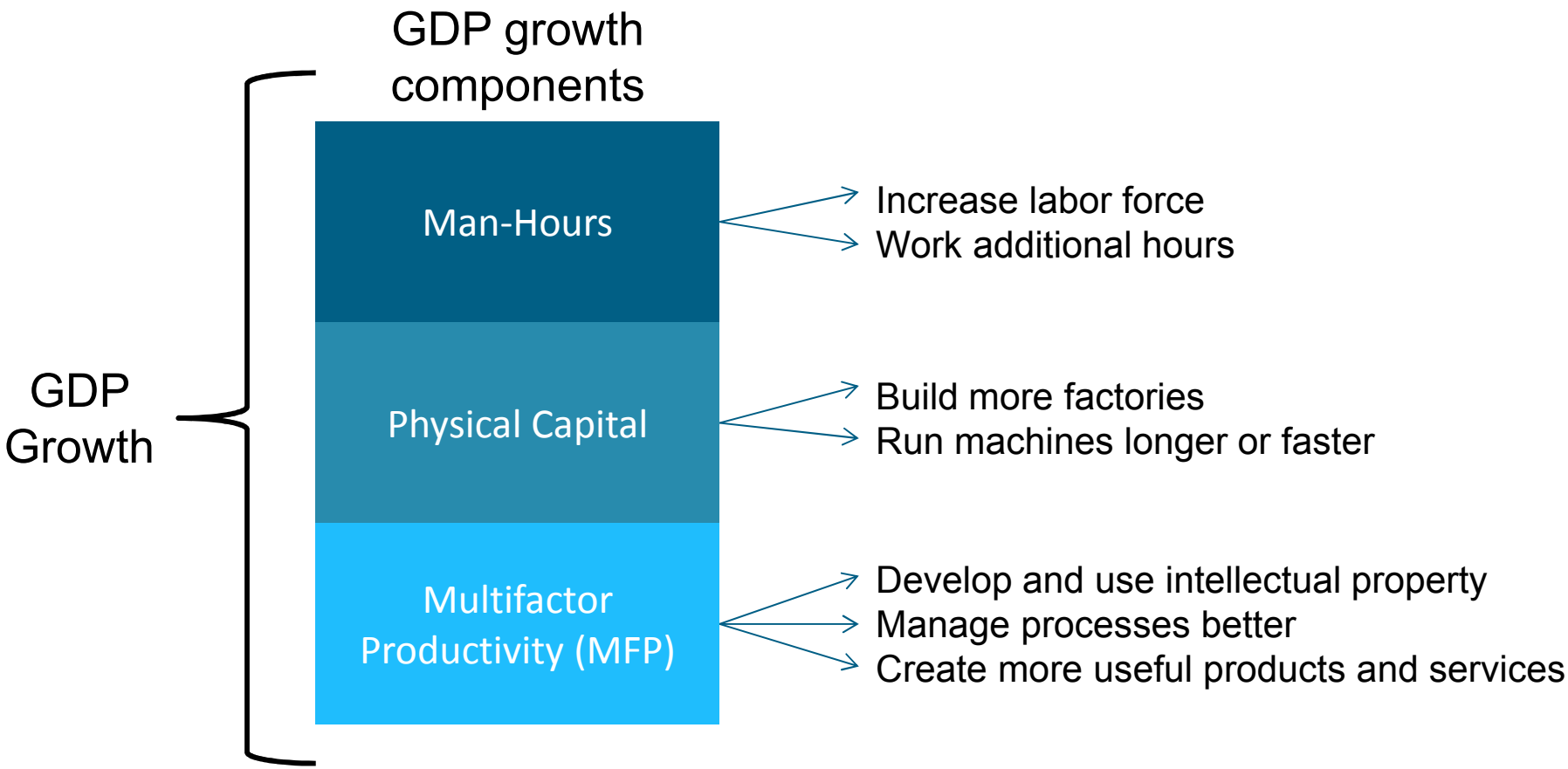
Sources: Cisco IBSG

Figure 1: Russia lags with respect to its development of economic clusters.



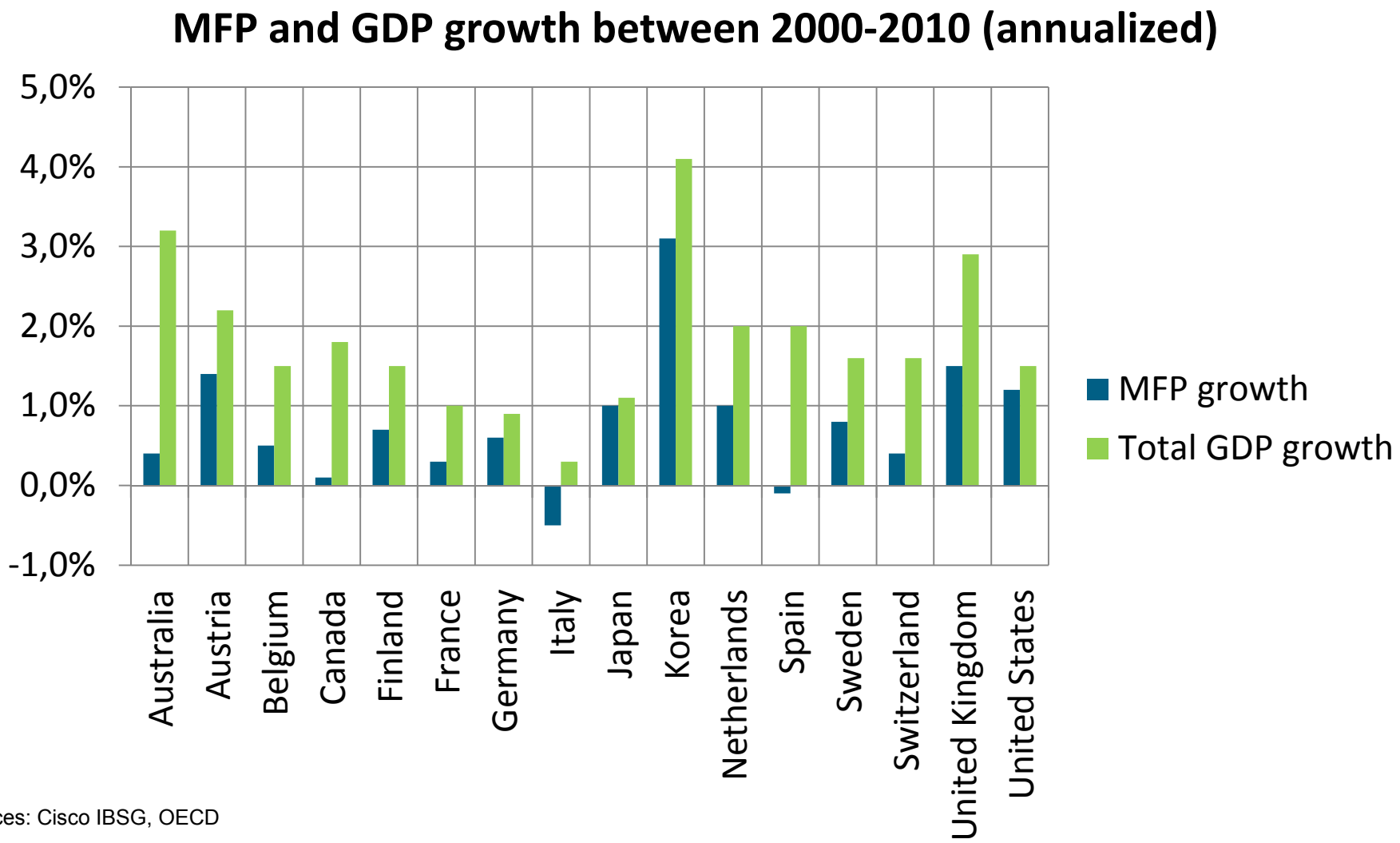
Source: World Economic Forum Global Competitiveness Report (selected countries)

Figure 2: Sources of GDP growth include more than man-hours or physical assets.



Sources: IBSG

Figure 3: Multi-factor productivity (MFP) contributes substantially to overall GDP growth.



Sources: Cisco IBSG, OECD

Figure 4: A cluster taxonomy

- Organic cluster – Clusters organized around gaining a favorable access to inputs, these inputs can be natural, man-made or virtual and include natural resources, access to very high-speed broadband or the availability of exceptional transportation assets.
- University-based cluster - Clusters developed around the research center of the university, with small spaces, a limited number of buildings, and 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. May also be used to promote economic growth in economically-depressed areas.
- Private sector led cluster – Clusters located in joint partnership parks or developer initiative parks, in 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 ("Triple Helix") partnerships - Clusters benefiting from large spaces, designed to enhance national, regional and local competitiveness. A mix of SMB & innovative start ups.

Sources: Cisco IBSG

2 The traits of highly successful clusters

The traits of highly successful clusters

- Emphasize attracting firms in sectors that are globally tradable.
- Promote SMBs to maximize employment growth.
- Locate in major economic areas with a sufficient physical and financial infrastructure and attractive lifestyle.
- Create and continuously develop a specialized and exemplary talent pool and communicate extensively.
- Maintain a strong and focused set of governance rules and management processes that include communications and commercialization.

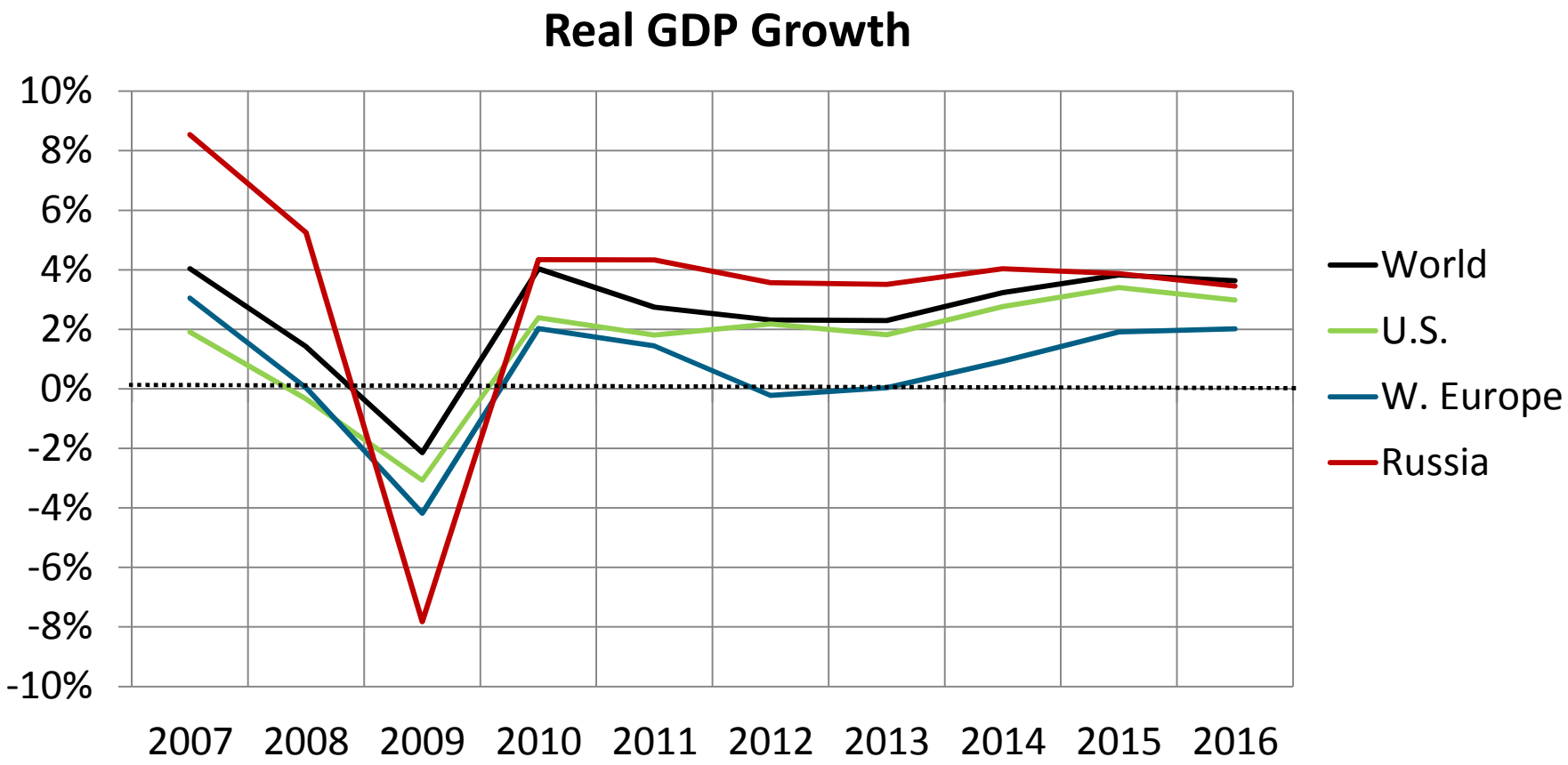
Figure 5: Examples of top tradable goods and services industries

Goods	Services
Processed Food	Business Services (consulting, communications, IT services)
Automotive	Financial Services (banking and insurance activities)
Metal Manufacturing	Knowledge Creation Activities
Plastics	Hospitality and Tourism
Information Technology Hardware	Transportation, Logistics, and Distribution Entertainment
Analytical Instruments	Oil and Gas Services
Medical Devices	Entertainment and Content Development

Sources: "Clusters, Innovation, and Competitiveness, New Findings and Implications for Policy." 2008 presentation by Michael Porter in Stockholm, www.isc.hbs.edu, Cisco IBSG

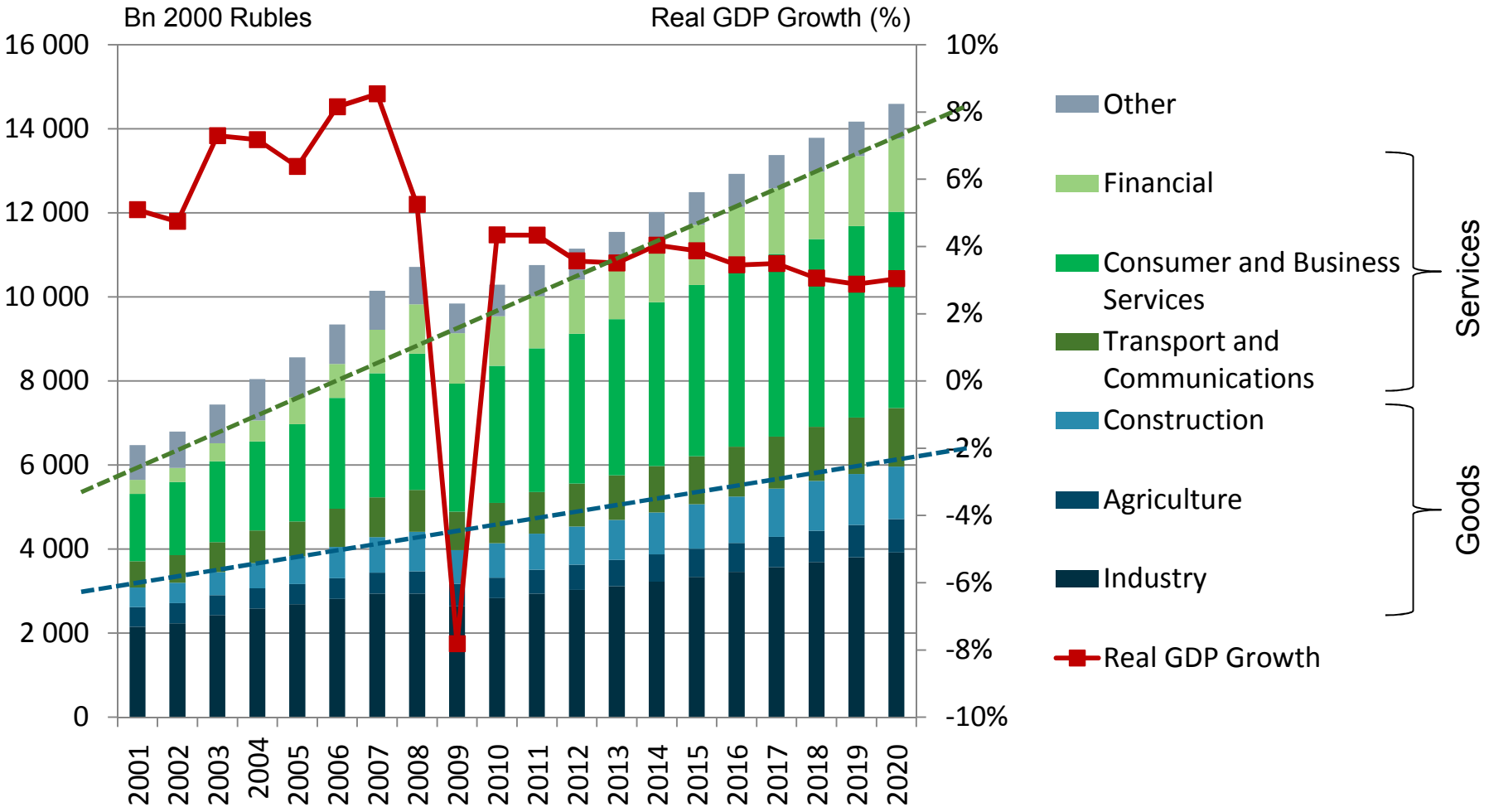
3 Examine why cluster development makes good economic policy in Russia

Russia's economic prospects are sound, especially compared with the U.S. and W. Europe.



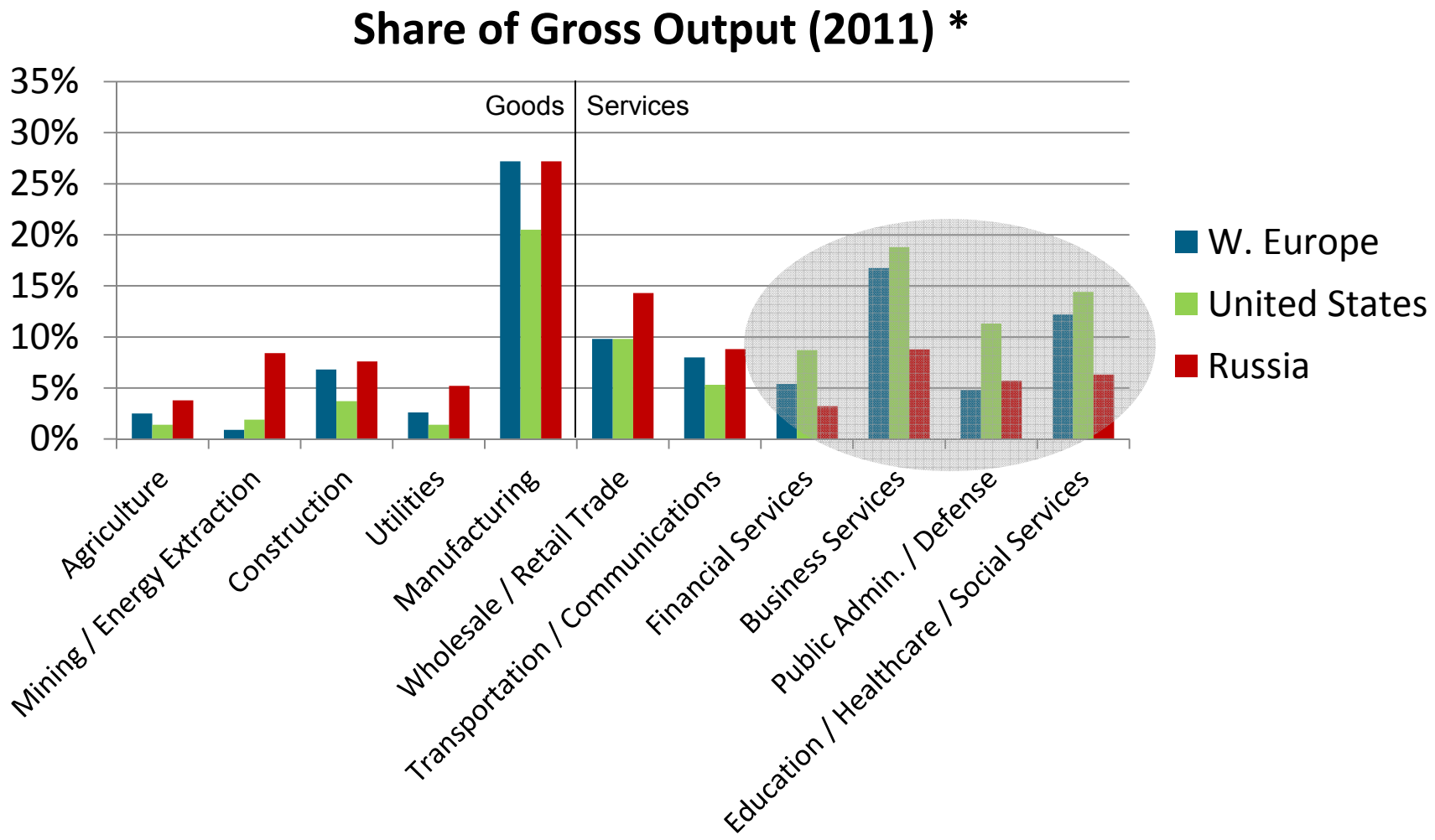
Sources: IBSG and Global Insight

Figure 10: In recent years, Russian GDP growth has been dominated by services.



Sources: IBSG and Global Insight

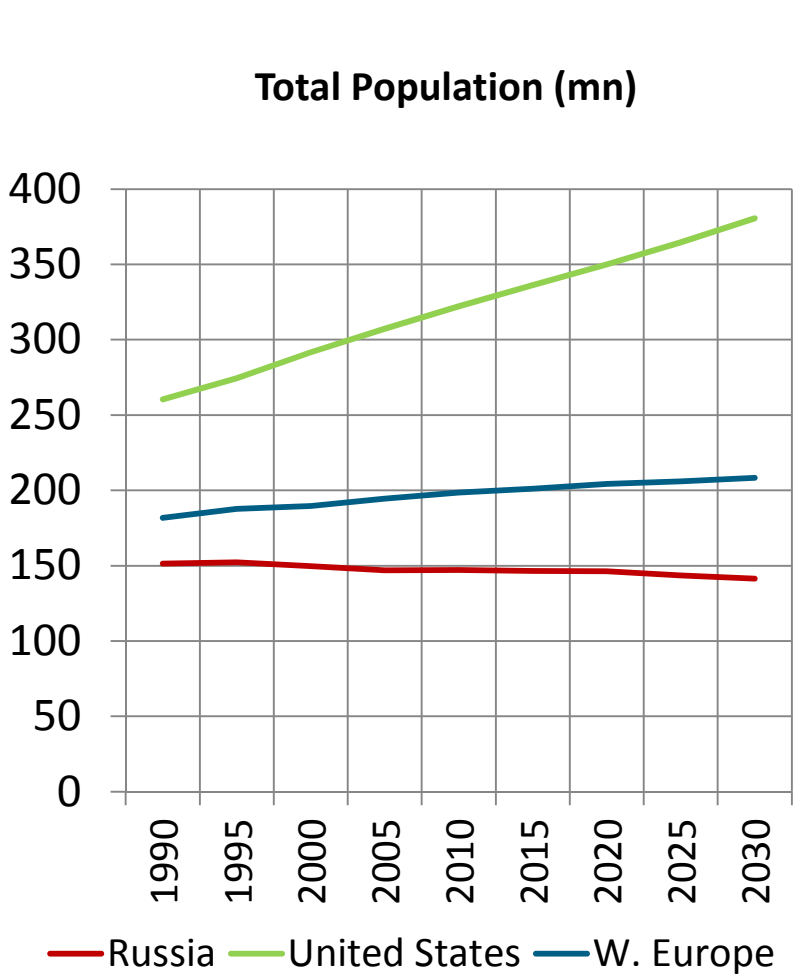
Figure 11: Russia's services sectors still have a lot of room to grow compared with Western Europe and the U.S.

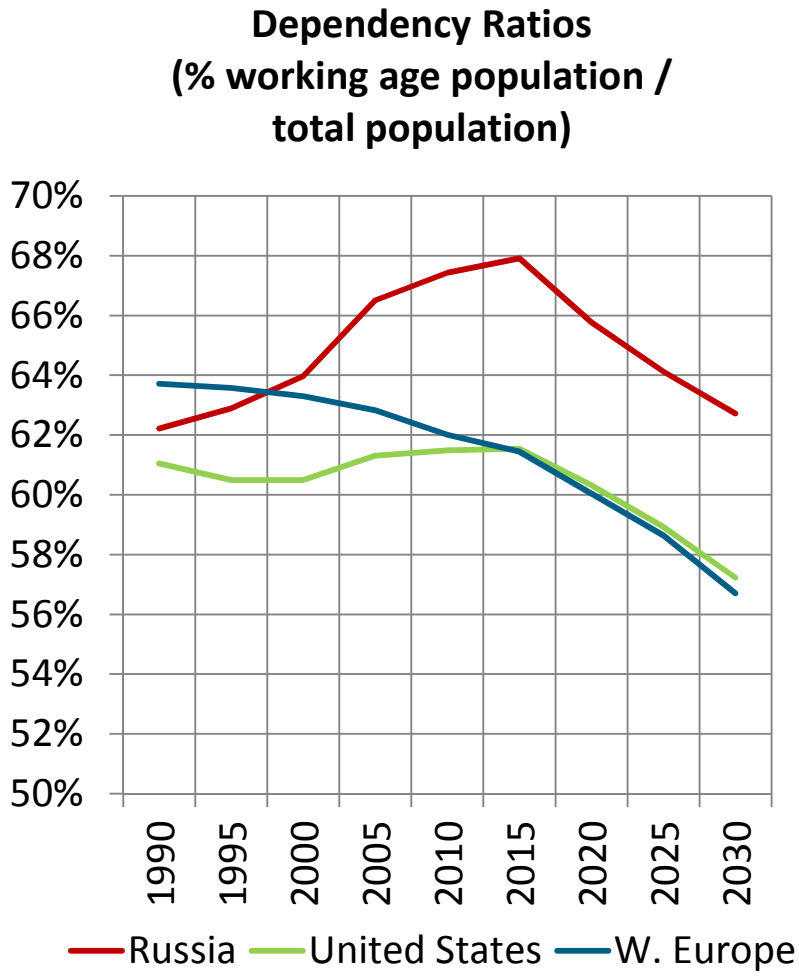


Sources: IBSG and Global Insight

* Non-key categories are omitted

Figure 12: Russia's shrinking and aging population will soon put pressure on economic growth.



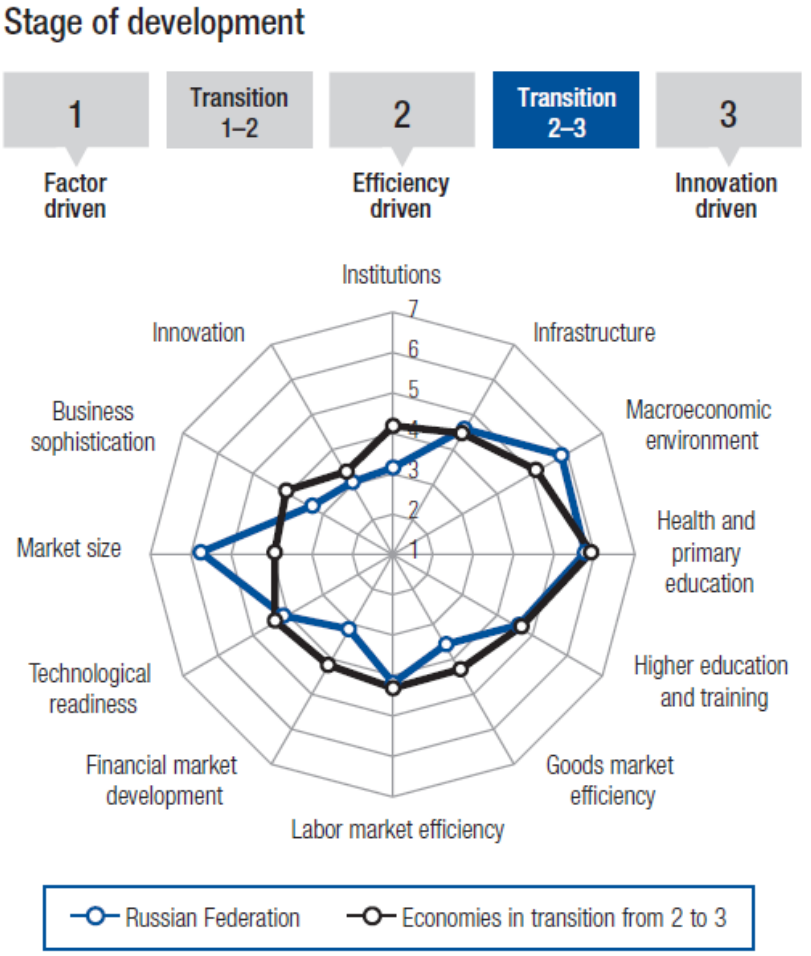


Sources: IBSG and UN

Figure 13: 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

Figure 14: 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

Figure 15: 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

Figure 16: 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

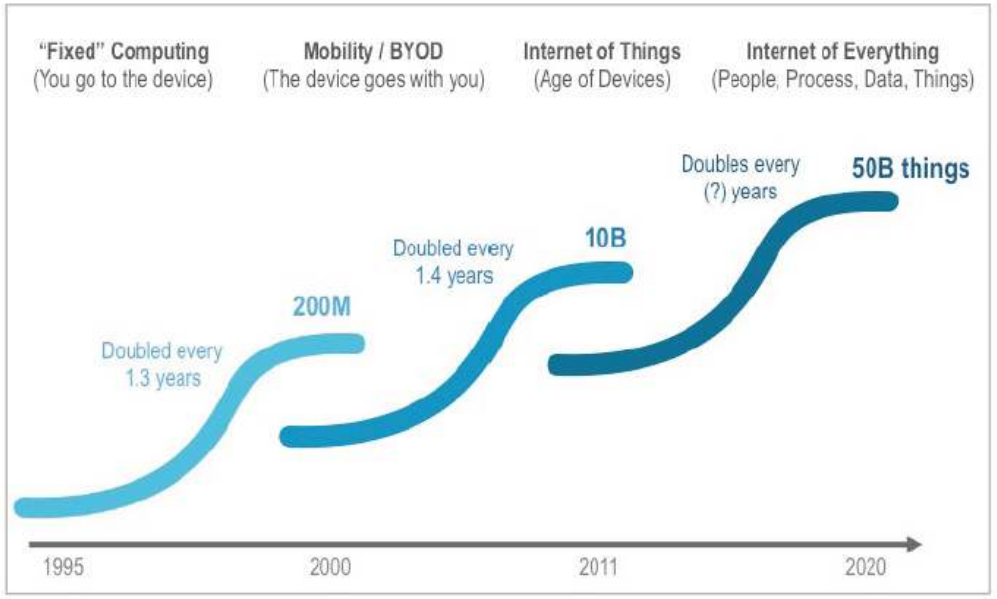
Source: World Economic Forum Global Competitive Report

4 Clusters and the Internet of Everything (IoE)

50 billion “things” will be connected in the Internet of Everything (IoE)

Cisco believes IoE brings together people, process, data, and things to make networked connections more relevant and valuable than ever before – turning information into actions that create new capabilities, richer experiences, and unprecedented economic opportunity for businesses, individuals, and countries.

Internet Growth Is Occurring in Waves.



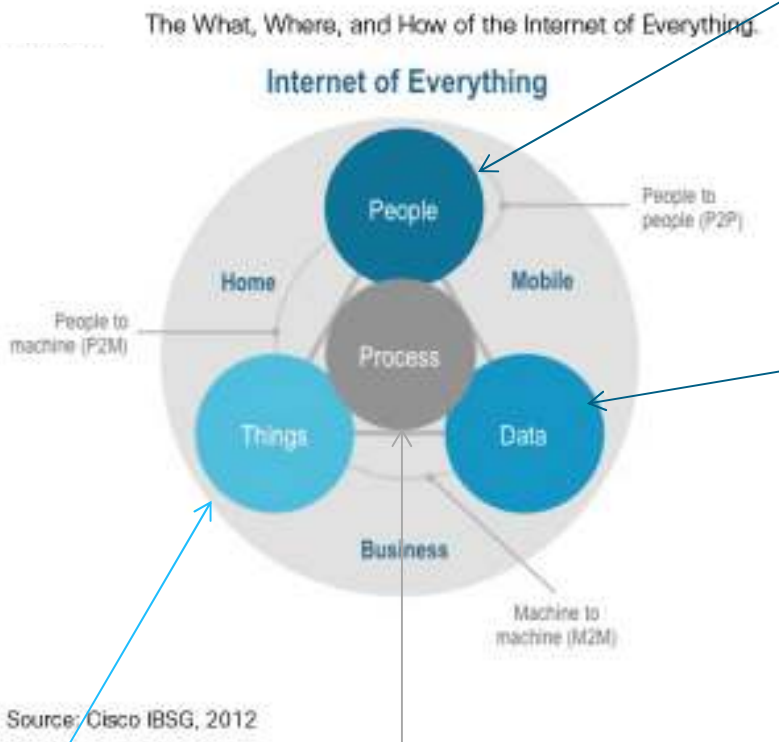
Source: Cisco IBSG, 2012

The Internet of Everything enterprise value mapping will provide Skolkovo with a road map of which types of companies to seek, and which types of cluster benefit to pursue.

Source: Cisco IBSG

The IoE framework exploits the network benefits inherent in clusters.

Rather than just reporting raw data, connected things will soon send higher-level information back to machines, computers, and people for further evaluation and decision making. This transformation from data to information in IoE is important because it will allow us to make faster, more intelligent decisions, as well as control our environment more effectively.



- PCs
- Tablets
- TVs
- Smartphones

- Environmental reporting sensors
- RFID devices
- Locational awareness
- Consumer devices
- Company assets

- "Big Data"
- Predictive analytics

Converting the results of People, Data and Things data into actionable information

Value at Stake

Definition: Potential value that can be created or will migrate among companies and industries in the emerging Connections Economy based on their ability to harness the Internet of Everything over the next decade (2013-2022).

Value at Stake ***includes:***

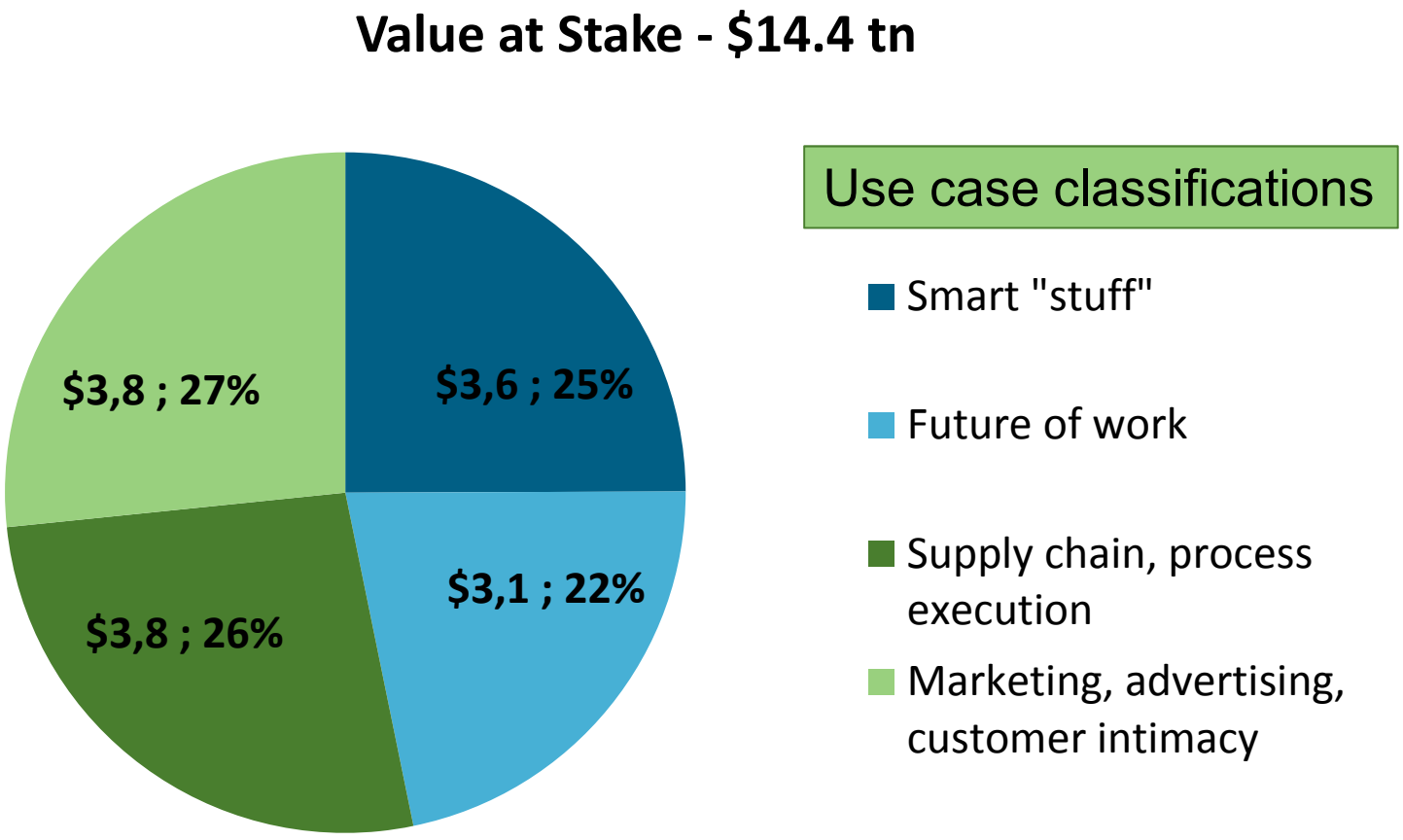
- Shifts of benefits between competing firms in a industry
- Shifts of benefits between different industries
- New-to-the-world revenue growth from innovation
- Cost savings from more efficient processes
- Allowances for implementation costs

Value at Stake ***does not include:***

- Extent of losses at firms that don't transform
- Consumer or government benefits
- Social benefits
- Value estimates for reduced risk of operations

Source: Cisco IBSG, 2012

Major Value at Stake sources are relatively evenly distributed among use cases

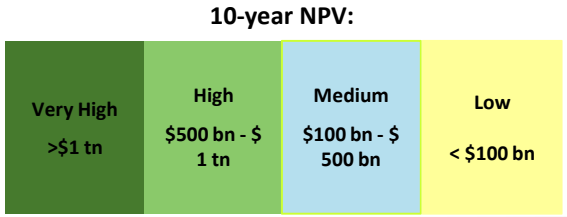


Source: Cisco IBSG, 2012

Use Case Analysis (1/4) –

Smart "stuff" - $3.6 tn Value at Stake

Use case	NPV of connections
1.) Smart grid - energy efficiency	High
2.) Smart buildings	Medium
3.) Connected vehicles	
SP revenues	Low
OEM savings	Medium
Commercial fleet savings	Medium
4.) Smart farming	Low
5.) Smart factories (factory automation)	Very High



Source: Cisco IBSG, 2012

Use Case Analysis (2/4) –

Future of Work - $3.1 tn Value at Stake

Use case	NPV of connections
6.) Travel avoidance	
Travel savings	High
Employee productivity	Medium
7.) Future of Work	
BYOD	Medium
Telecommuting	Very High
VDI	Low
Mobile Collaboration Tools / Webification of Apps	High

10-year NPV:

Very High	High	Medium	Low
>$1 tn	$500 bn - $ 1 tn	$100 bn - $ 500 bn	< $100 bn

Source: Cisco IBSG, 2012

Use Case Analysis (3/4) –

Supply Chain, Process Execution - $3.8 tn Value at Stake

Use case	NPV of connections
8.) Supply chain efficiency	
Time-to-market	Very High
Execution and purchase efficiency	High
9.) Security	
Physical security and surveillance	High
IT security	High
10.) Improved medical management	Medium
Remote patient monitoring	Low
Avoidance of duplicate or unnecessary tests	Low
11.) Virtual Secretaries and Receptionists	Medium
12.) Business Process Outsourcing (BPO) and related Processing Services	High

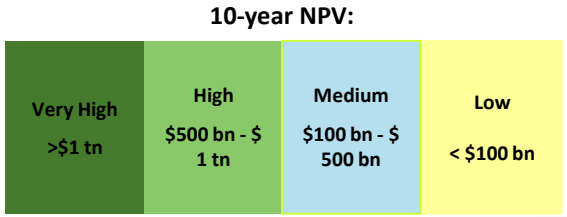
10-year NPV:

Very High	High	Medium	Low
>$1 tn	$500 bn - $ 1 tn	$100 bn - $ 500 bn	< $100 bn

Source: Cisco IBSG, 2012

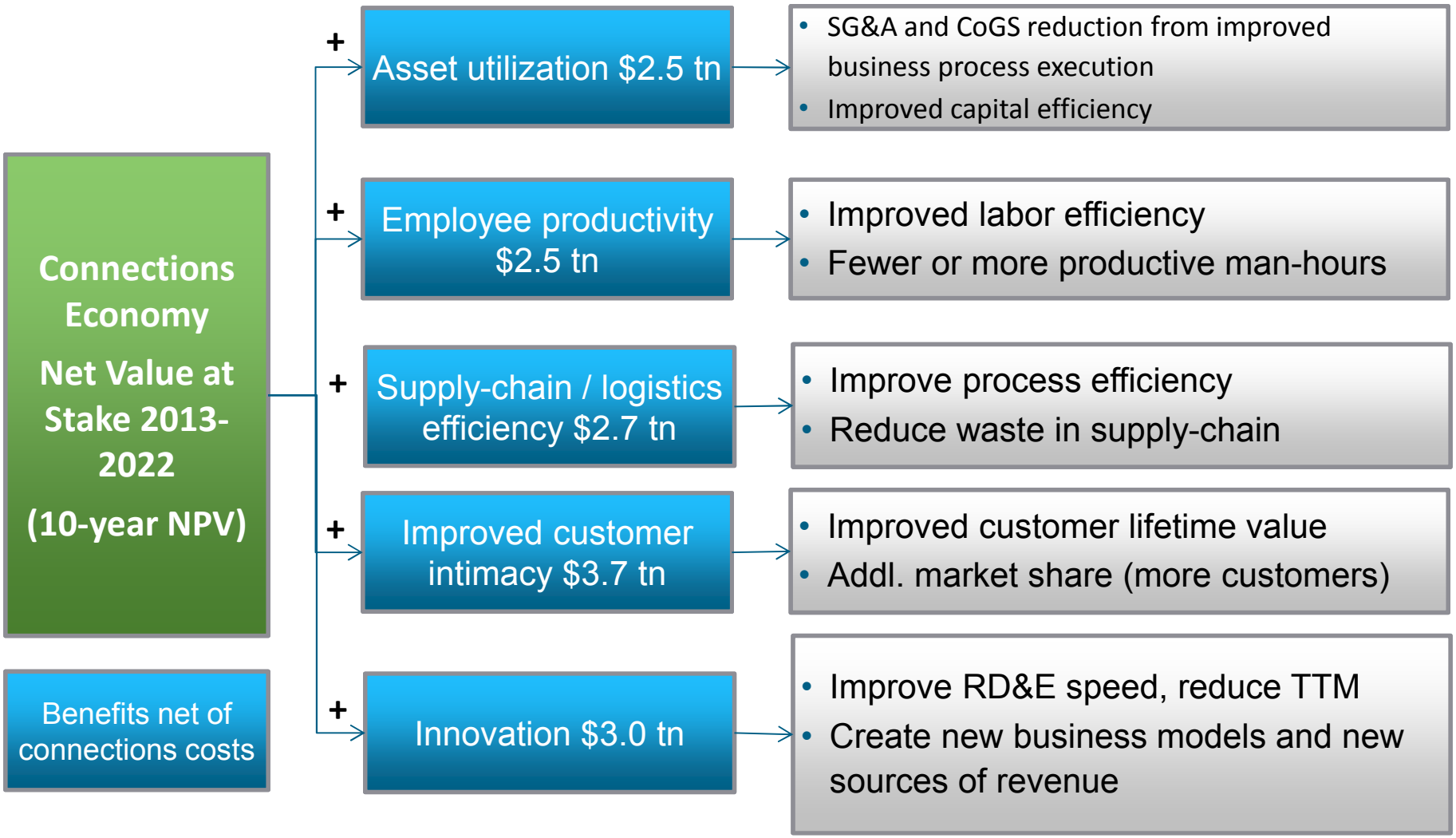
Use Case Analysis (4/4) –
Marketing, Advertising, Customer Intimacy - $3.8 tn Value at Stake

Use case	NPV of connections
13.) Wealth Management	Medium
14.) Retail Banking Branch of the Future	Low
15.) Digital Malls / Connected Vending	Low
16.) Connected Gaming and Entertainment	Medium
17.) Digital Signage	Low
18.) Virtual Private Education	Low
19.) Transactions Payments Rationalization	High
20.) Connected Advertising and Marketing	Very High



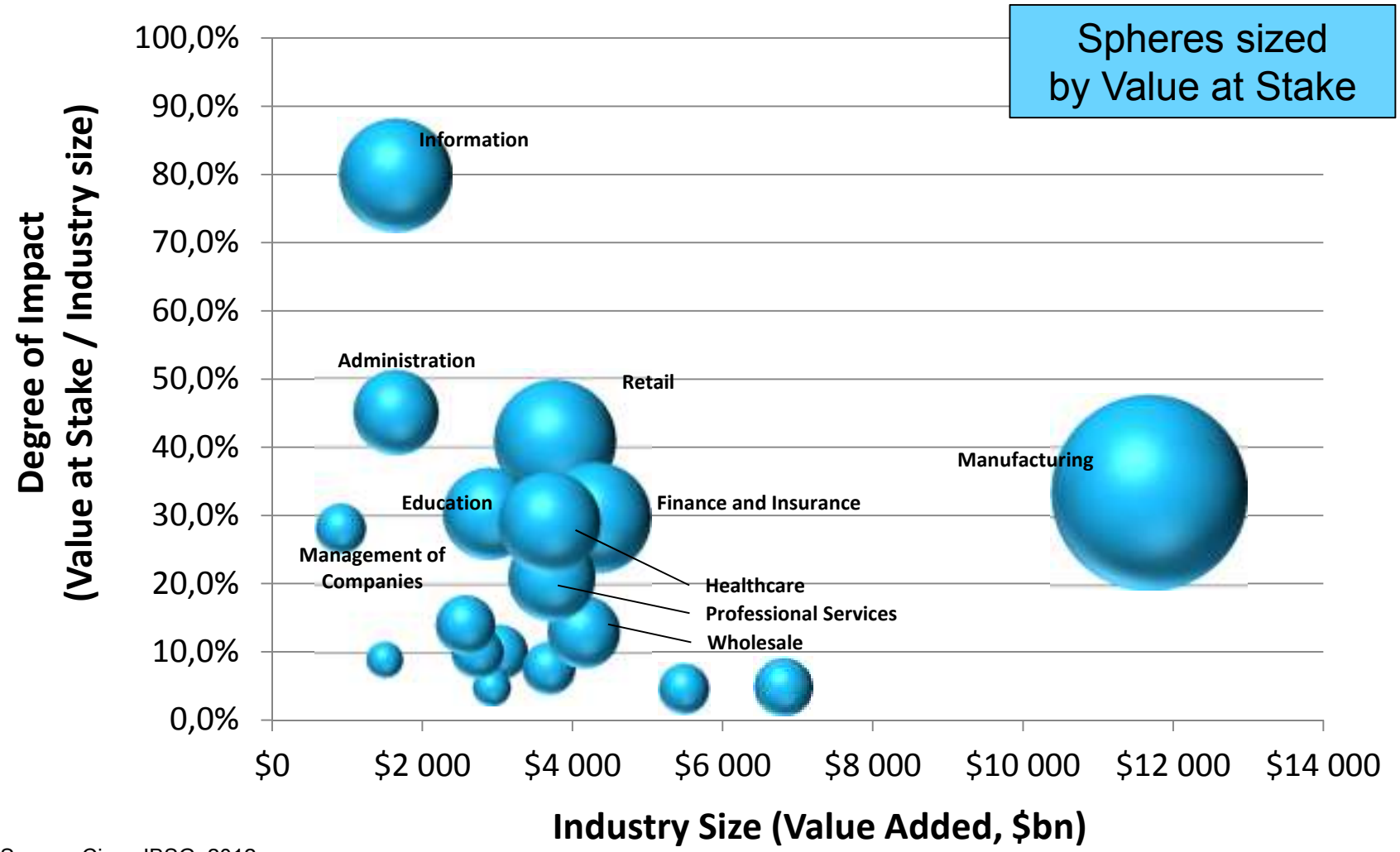
Source: Cisco IBSG, 2012

How does CE drive value for companies? Value framework consists of 5 value drivers



Source: IBSG, 2012

The top 5 Industries with the highest potential IoE impact represent 63% of the Value at Stake



Source: Cisco IBSG, 2012

Cluster implications of Use Cases

Use case classification	Cluster differentiating features
"Smart stuff"	• Awareness of best practices • Managing complex implementations
Future of Work	• Employee empowerment • Tools for collaboration • Availability of advanced IT infrastructure
Supply Chain, Process Execution	• Proximity of suppliers • Shared resources
Marketing, Advertising, Customer Intimacy	• Culture of innovation • Supporting early adopters • Achieving network effects

Source: Cisco IBSG, 2012

Key messages in the Value at Stake data

- The potential displacement of tradable goods and services markets is huge. Value at Stake consists of:
  - Shifts between competing companies within an industry
  - Shifts between industries as technology displacement grows
  - Net-new economic growth from innovation
- A winner-take-all market structure will become increasingly prevalent due especially rapid globalization and much easier entry in markets
  - Technology and network effects will reduce production and marketing costs for “winners”
  - Best practices-level operations will be necessary to remain competitive
- About 2/3 of the Value at Stake will be focused in individual industries (e.g., manufacturing automation) rather than cross-industry benefits (e.g., telecommuting, wealth management)
- Most of the Value at Stake will involve M2M or M2P communications
  - Requires advanced IT infrastructure
  - Requires advanced analytical skills
  - Presumes that significant deregulation of IT communications and services delivery processes will occur
- Use of IT to reduce costs is low-hanging fruit because of its relatively low risk, but these processes are self-limiting – you can only reduce costs by so much. In contrast, IT investments to strengthen or widen the customer base historically have yielded better results and have no upside limit.

Source: Cisco IBSG, 2012

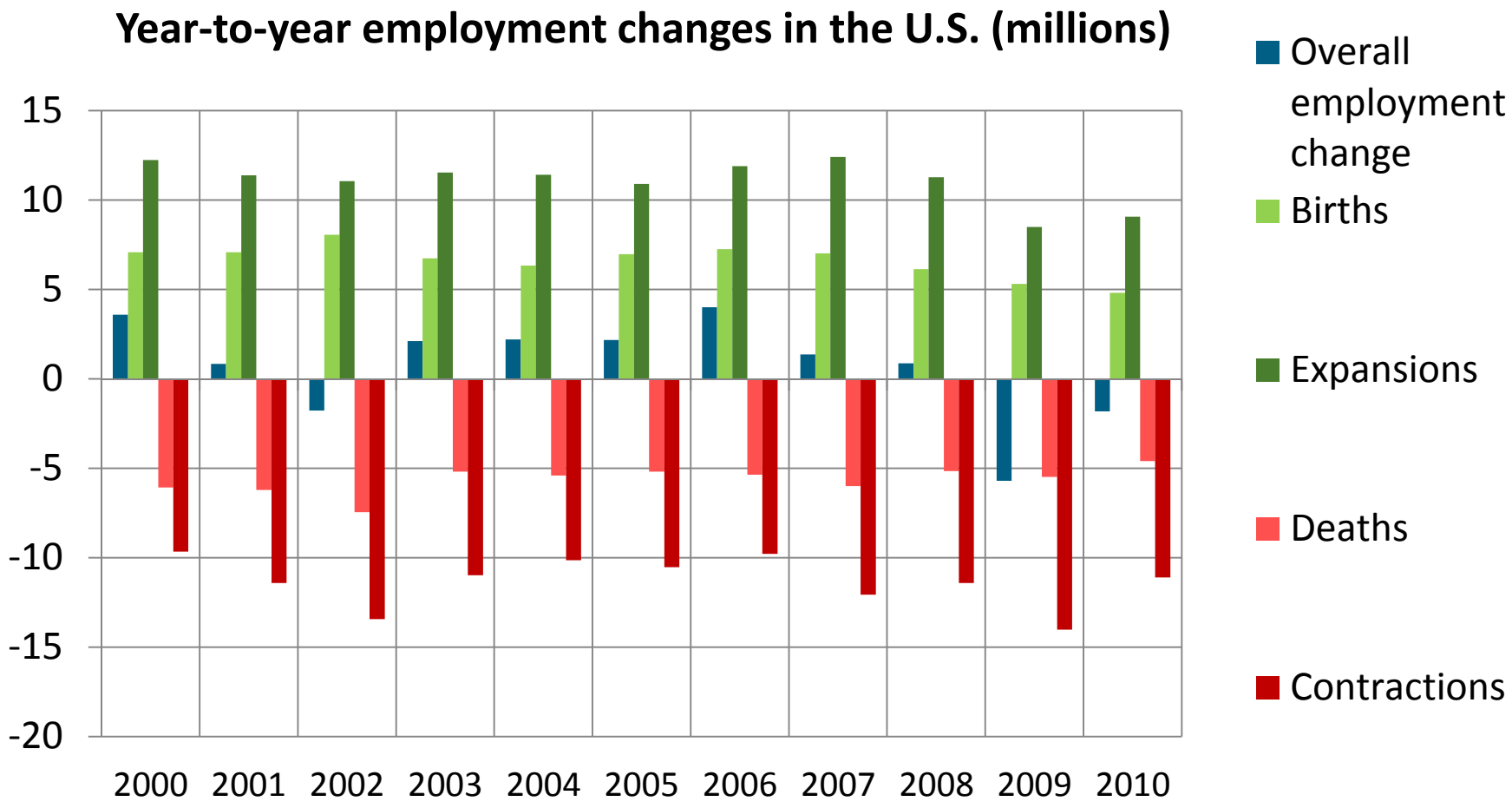
5 Modeling Skolkovo's Economic Contributions

Cluster Success Metrics and Considerations

- Measurement of contribution to overall economy or overall economic growth?
- Geographic scope (cluster area only or spillover effects into surrounding regions and industry sectors)?
- Distinguishing between net, new economic growth versus growth that might have occurred anyway, or “stealing” growth from other areas of the economy.
- Time period? The economic impact of clusters may take several years to become evident.

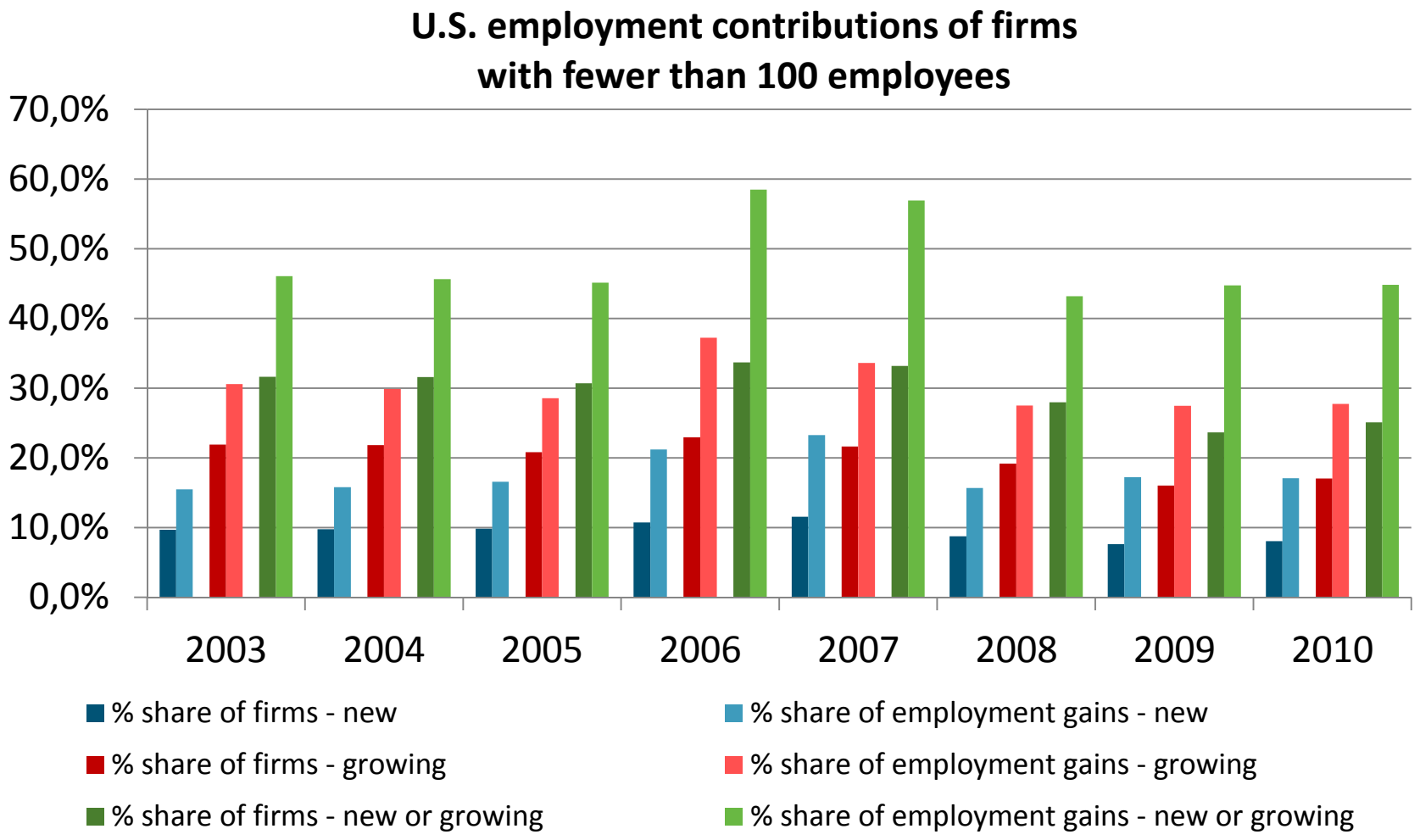
Source: Cisco IBSG, 2012

Figure 6: Overall employment growth is really the sum of two positive and two negative elements.



Sources: Cisco IBSG, BLS

Figure 7: Historically, SMBs have contributed a significant share of overall U.S. employment growth.



Sources: Cisco IBSG, BLS

Figure 8: 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.

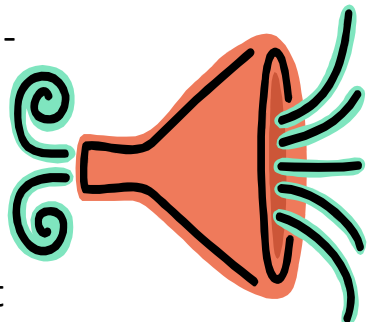
Sources: Cisco IBSG

Errors may exist due to rounding.

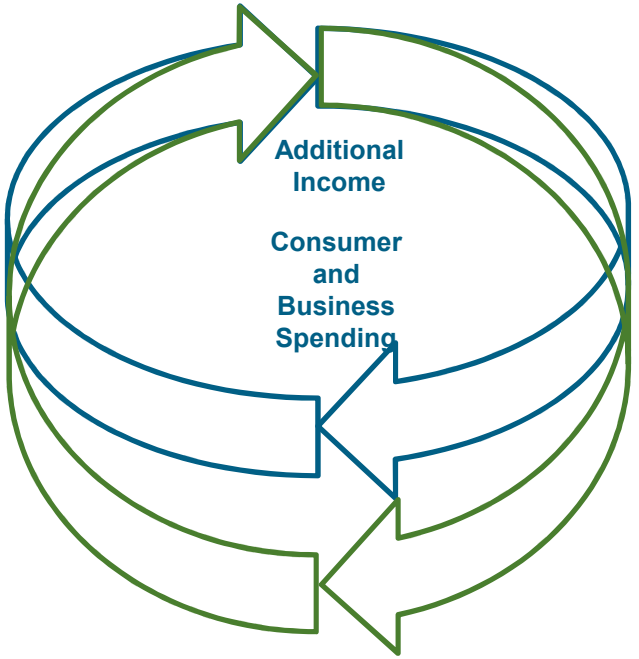
The initial benefits of cluster will grow through economic multiplier and accelerator impacts.

Initial impacts

- Labor-related
  - Incremental employment growth
  - Increases in output / man-hour
  - Wage growth
- Capital-related
  - Business fixed investment growth (minus imports)
  - Increased production efficiency
- Multi-factor productivity growth



Multiplier impacts



Additional investment to support larger economic

Accelerator impacts

Sources: Cisco IBSG

Major cluster contributors to economic growth.

Cluster economic benefit	Assumption	Source	Comments
Employment growth (from new and existing firms)	Based on U.S. information industry growth (6.5% per annum with moderate macroeconomic growth)	IBSG analysis of U.S. Bureau of Labor Statistics data	Growth is measured from the overall economy; probably does not include the collaborative synergies created by clusters and therefore may underestimate the benefits.
Higher wages	5.5% for apples-to-apples comparison	Brookings Institute Study	
Multi-factor productivity (MPF) growth	Annual increase of 0.8% of output	Gap analysis of best and worst OECD countries applied to the cluster output	Same as employment growth
Business fixed investment	$265,000 in assets added per new employee with 5-year life ($53,000 / annum)	Calculation based on Capital IQ data and Russia in Figures Statistical Handbook	Some of this investment may involve imported capital equipment and therefore not add to GDP.

Figure 9: Cluster economic benefits summary for a selected year.

Benefit area	Amount ($mn)
Contribution to economic output	$488
Additional contribution to economic growth (annually)	
-- Employment gains	$9
-- Wage gains	$10
-- Multi-factor productivity	$4
-- Business fixed investment	$26
--- Total	$76
TOTAL CONTRIBUTIONS* (end of Year 1 of analysis, without multiplier effects)	$537
TOTAL CONTRIBUTIONS* (end of Year 1 of analysis, with multiplier effects)	$1,155

Source: Cisco IBSG

* = Assumes fully mature cluster

6 Implications for Skolkovo

Implications for Skolkovo

- Maintain strong policy of attracting mix of Russian and non-Russian multinational businesses.
- Ensure diverse mix of industry groups is included, especially financial and manufacturing firms.
- Promote export growth through adding marketing, bureaucratic, and trade-financing capabilities.
- Keep IT investments as current as possible. Ensure that IT and business training is available to cluster-members.
- Dedicate about 2/3 of resources to helping existing cluster members expand versus attracting new-to-the-world businesses.
- Ensure capacity and financial capabilities exist to expand business fixed investment as employment grows.
- Product-lead times in several of Skolkovo's sectors will be shrinking in the future, suggesting that more early stage companies will benefit the most.

Source: Cisco IBSG, 2012


CISCO