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Centre for the
Study of Living
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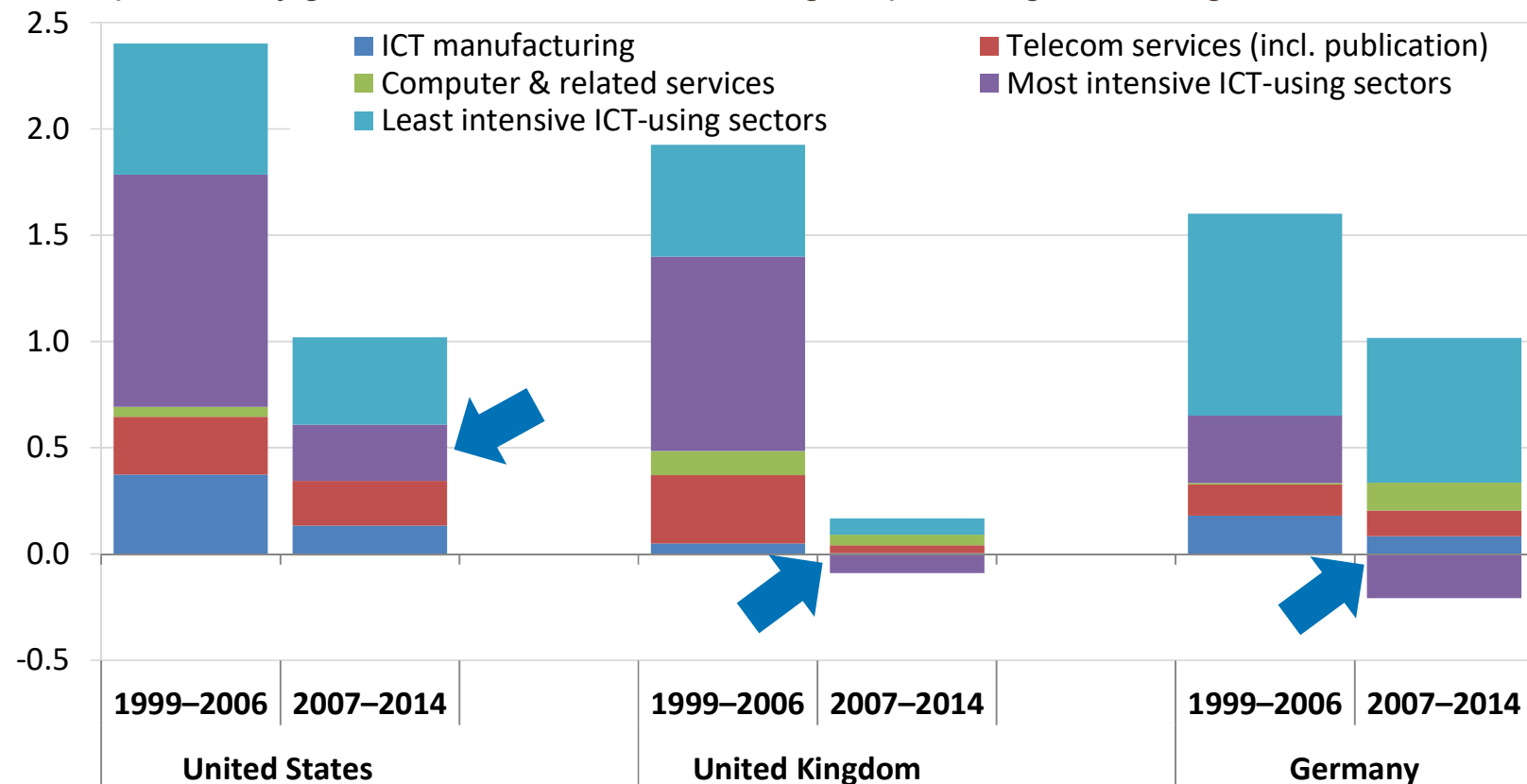
NAVIGATING THE NEW DIGITAL ECONOMY

Driving digital growth and productivity from installation to deployment

Bart van Ark
October 17, 2016

The productivity paradox: intensive digital-using industries are contributing most to productivity slowdown

Labor productivity growth and contributions from digital- producing and –using sectors, in %



Note: “Most intensive ICT-using industries” refer to the top half of the industries with the highest share of value of ICT investment plus purchases ICT services as a percentage of “synthetic output” (which is value added at industry level plus the intermediate use of ICT services). Least intensive ICT-using sectors refer to the bottom half of industries in terms of ICT intensity.

Source: Bureau of Economic Analysis; Bureau of Labor Statistics; Eurostat; The Conference Board

Digital Transformation drives the transition from the Old Digital Economy to the New Digital Economy



The Old Digital Economy (1980s-2000s)

Digitization driven by the rise of the personal computer and the internet as key drivers of greater business efficiency, creating access for individuals to digitization and the beginning of e-commerce.

The New Digital Economy (as of 2000s)

Digitization driven by a combination of mobile technology; ubiquitous access to the internet; and the shift toward storage, analysis, and development of new applications in the cloud.

Digitization ≠ Digital Transformation

Digital Technologies

- Internet
- Mobile
- Embedded sensors
- Cloud
- Social Media
- Enterprise Platforms
- Public or open platforms
- Artificial intelligence/cognitive computing
- 3-D printing

Digital Transformation

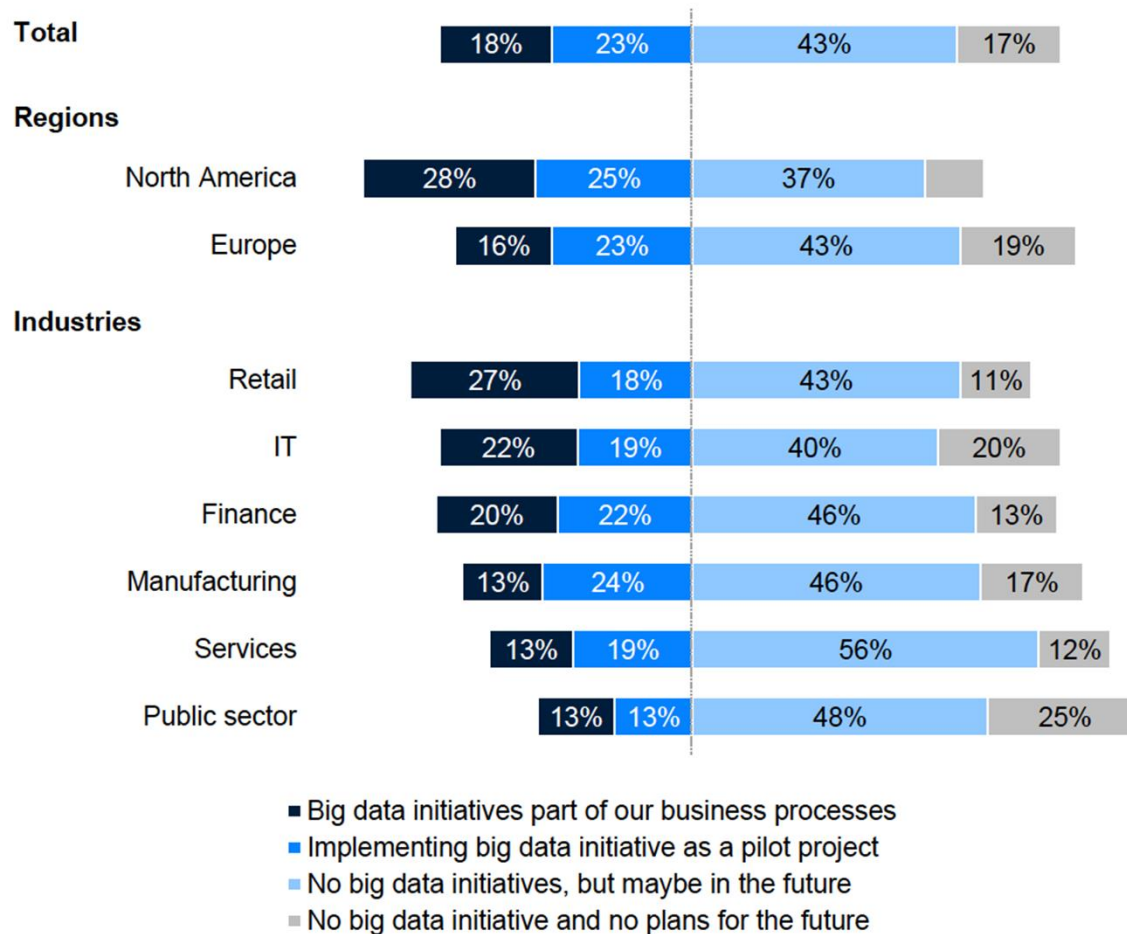
The use of digital **technologies** and the **data** they produce to

- Connect organizations, people, physical assets, processes, etc. in new ways
- Rapidly develop new products, services, markets, business models
- Meet emerging customer needs

What Gets Transformed in Digital Transformation?

- The organization's strategy
 - ✓ What business are we in?
 - ✓ Who/where are our customers? What do they need/want?
 - ✓ Who are our competitors?
 - ✓ Who are our partners?
 - ✓ Where are our organizational boundaries?
 - ✓ What jobs, skills, etc. do we need?
 - ✓ Where should we be located?
 - ✓ How should we be structured?
- In some cases, an entire industry
- May take place in pockets, company-wide or industry-wide

Contrary to all the hype, big data still relatively in early stages – to make progress companies need to embed digital in their operating processes



Commentary

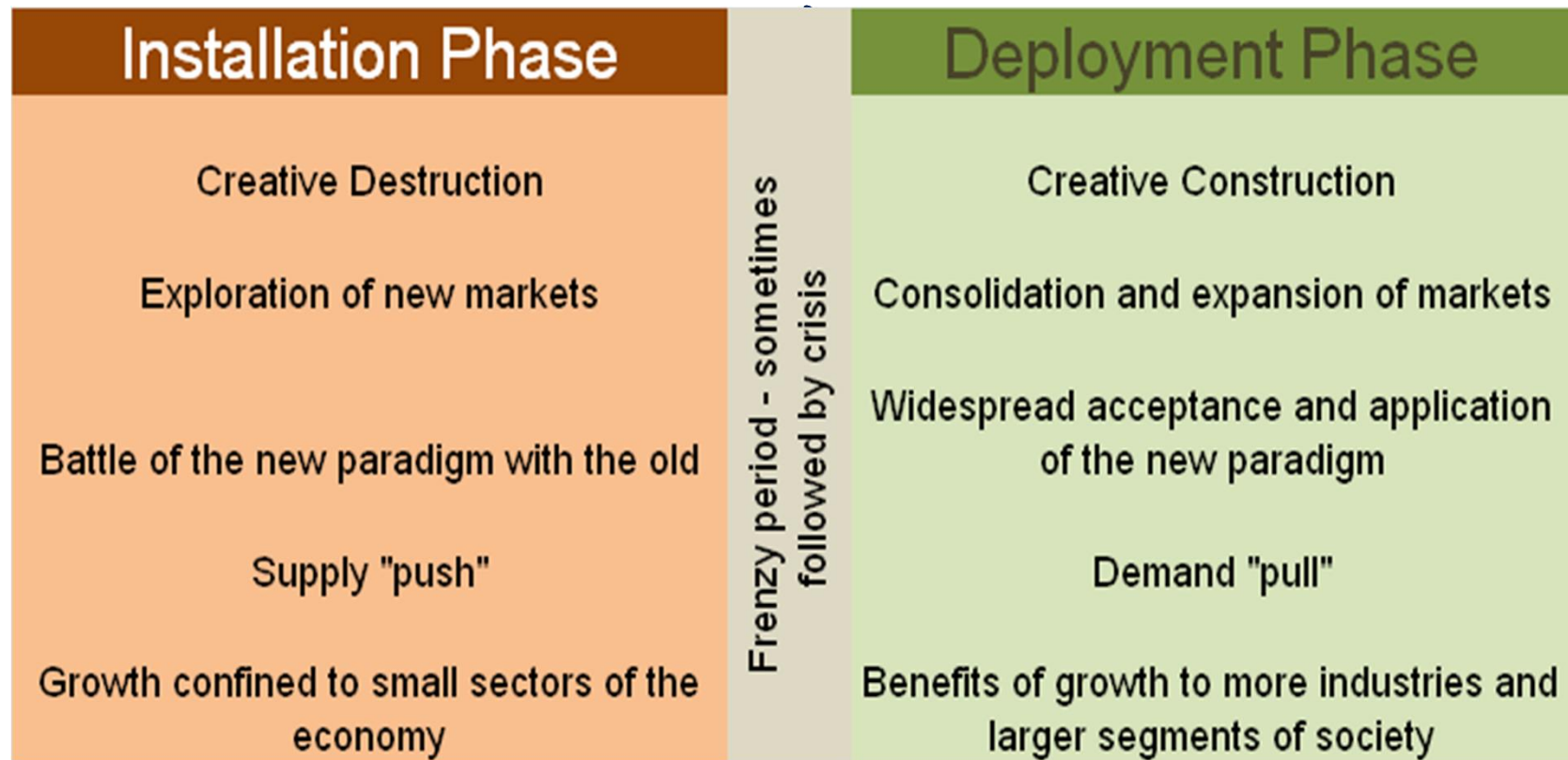
Less than half the companies from a large sample (n=526) just conducted have embedded big data in their operations or are piloting it

North America more advanced than Europe as is retail which has an explicit customer marketing focus

Not surprisingly, manufacturing applications trail others, but are also piloting usage at the highest rates

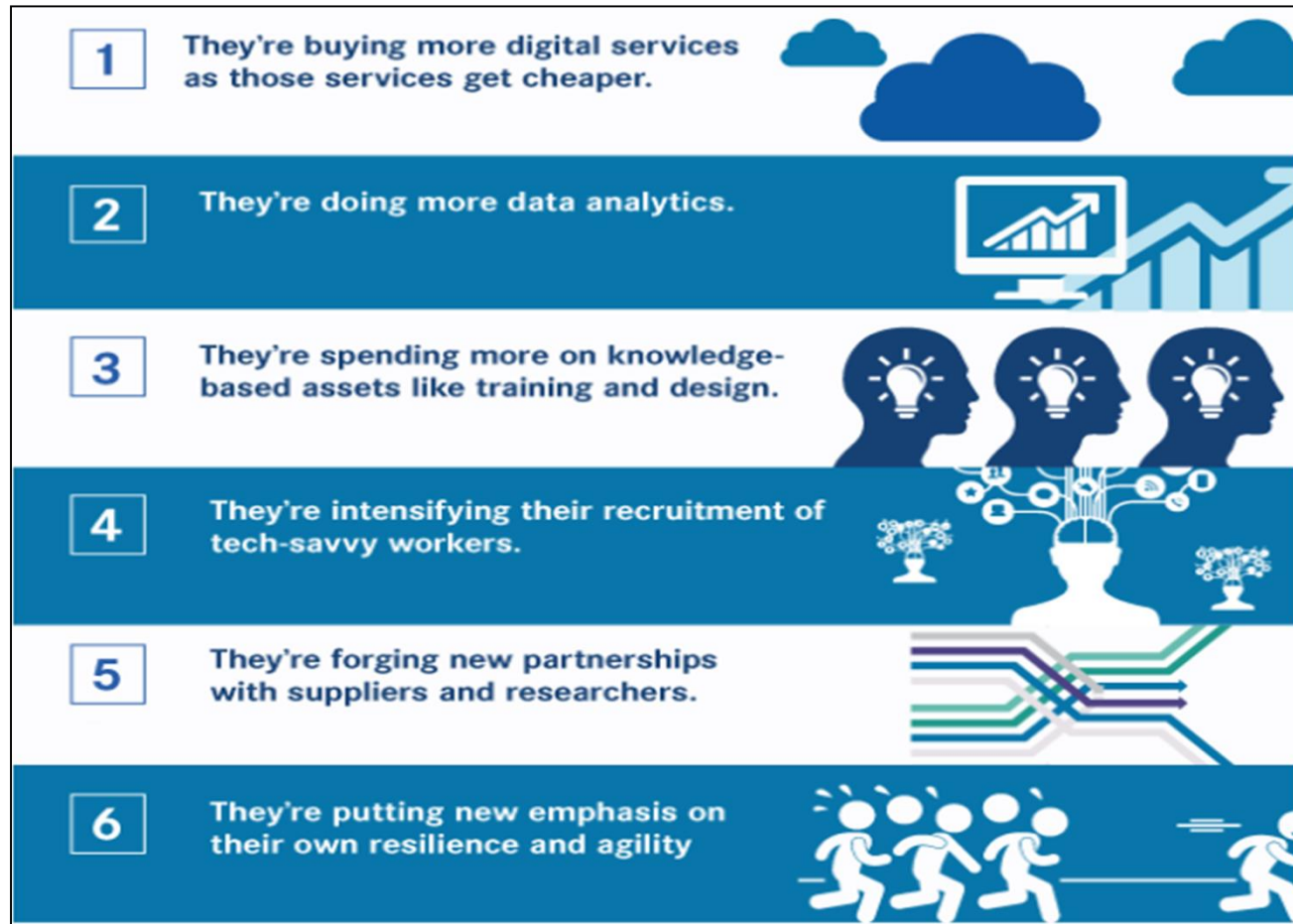
Source: BARC 2015 Survey

We are still in the Installation Phase of the New Digital Economy



Source: based on Carlota Perez, *Technological Revolution and Financial Capital. The Dynamics of Bubbles and Golden Ages*, (Cheltenham, United Kingdom, Edward Elgar Publishing Limited), 2002

Six things that companies do in order to succeed in the New Digital Economy



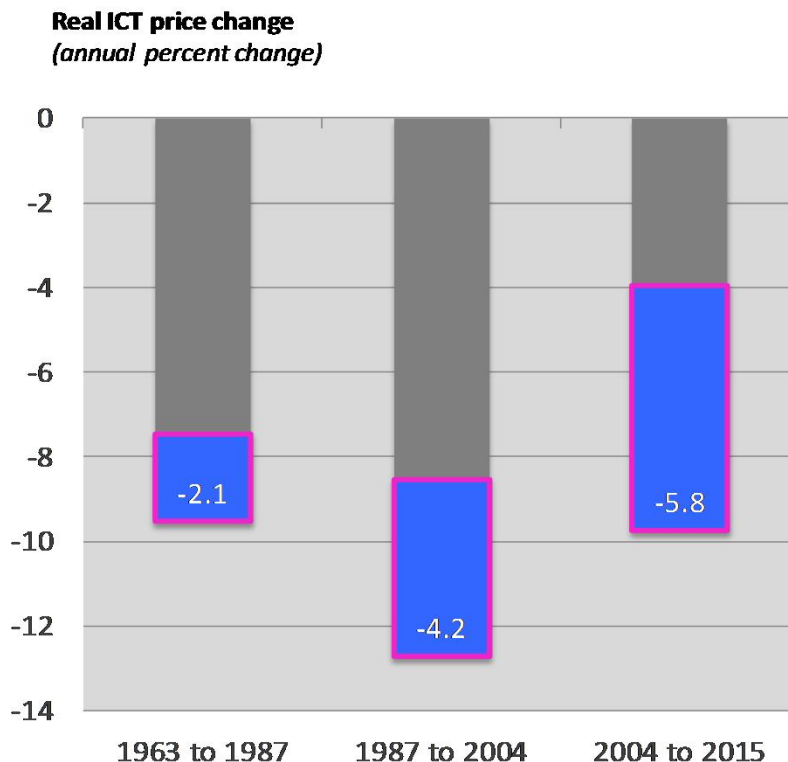
Source: Navigating the New Digital Economy (The Conference Board, 2016). <https://www.conference-board.org/digital-transformation-economies/>

1. Ongoing rapid price declines in ICT assets and services provide large opportunities for business to reduce costs

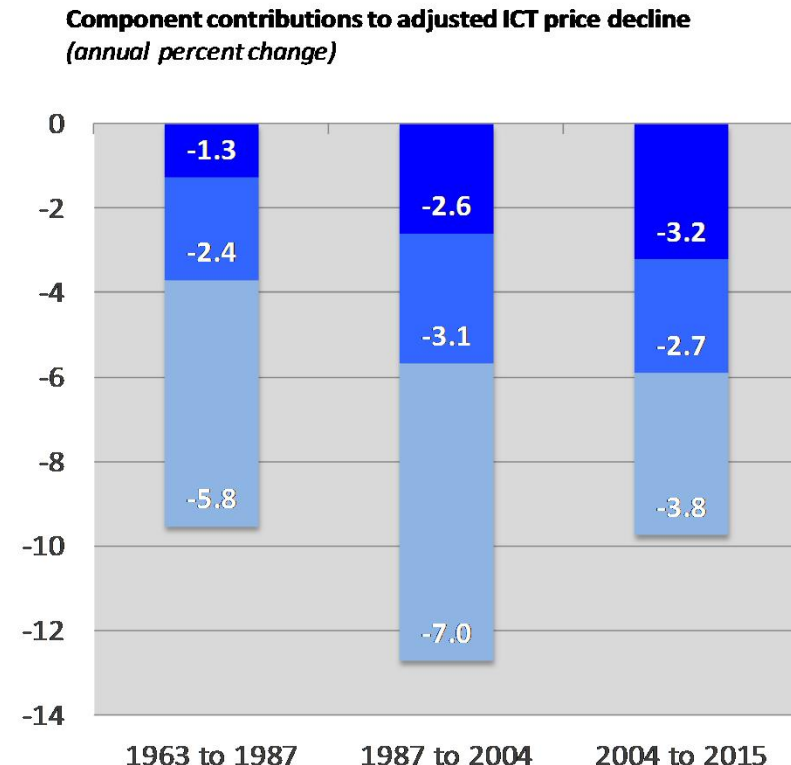
CHALLENGES	ACTIONS
<ul style="list-style-type: none">• The spend comes before the gain requiring a medium-term orientation• The price declines may begin to moderate	<ul style="list-style-type: none">• <i>Factor in realistic potential cost gains into ROIs on future investment plans</i>• <i>Cut fixed cost by leveraging the business flexibility gained through better utilization of data capabilities</i>• <i>Drive variable cost down to zero through scale. Take advantage of large suppliers willing to pass on their scale advantages to their customers in terms of lower cost</i>• <i>Anticipate that the customer is getting used to free or cheap content, switching quickly between offerings, and only willing to pay a premium for exclusive new features</i>

Price declines of digital technologies have been increasingly understated

Changes in official and research price indexes for ICT investment



■ Additional decline in adjusted prices
■ Official price decline



■ Computers and peripherals
■ Communications equipment
■ Software

Source: David Byrne and Carol Corrado (2015)

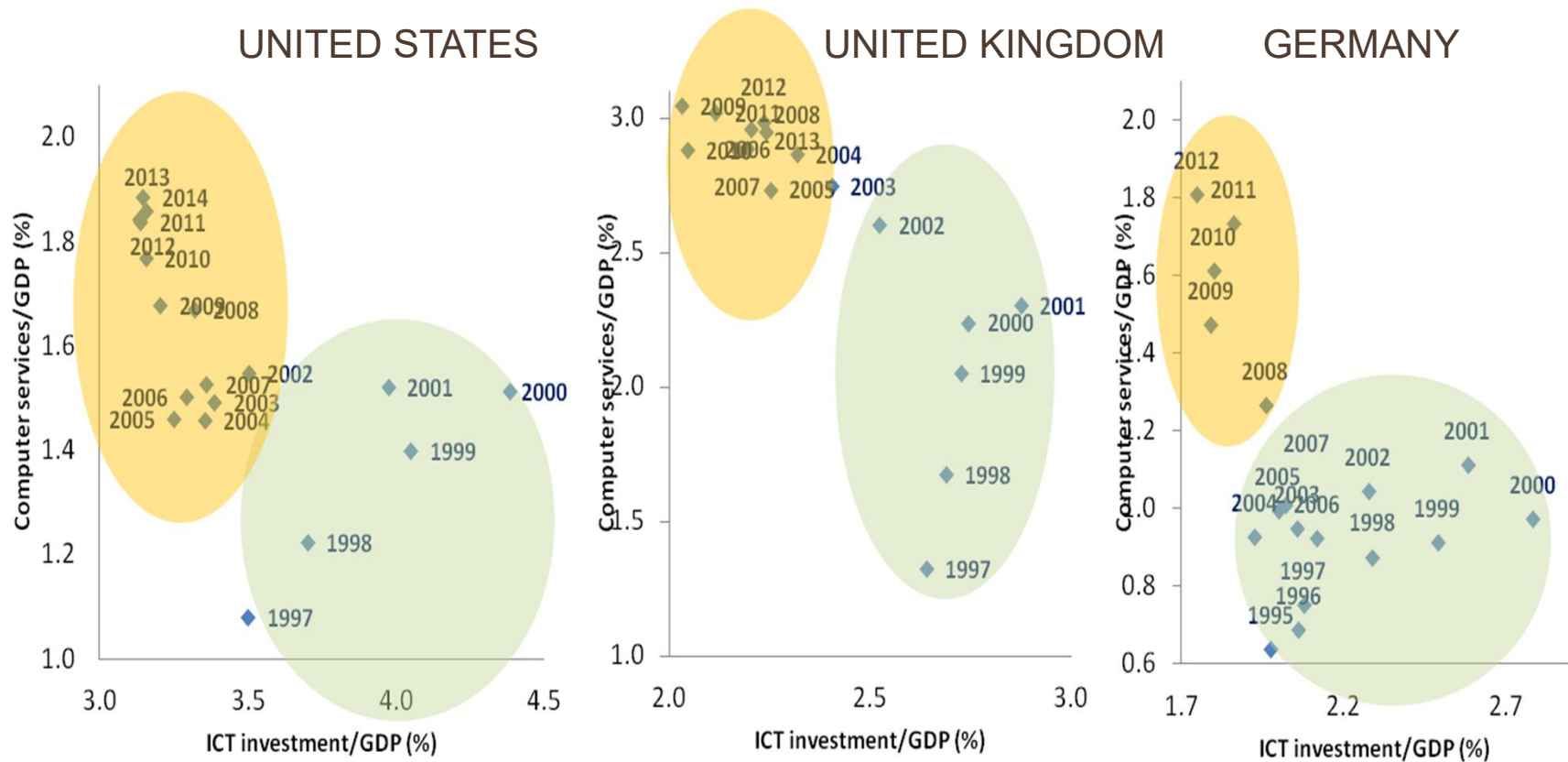
Note: Real ICT price change is the change in the price index for ICT goods relative to the change in the price index for total GDP. Adjusted prices are official prices corrected for measurement issues.

2. The shift from investment in ICT assets to strategic purchases of digital services is significantly increasing business flexibility

CHALLENGES	ACTIONS
<ul style="list-style-type: none">• Choosing the best platforms from the abundance of offerings across the computer and software services landscape to maximize performance• Cost overruns easily emerge from the integration of ICT services	<ul style="list-style-type: none">• <i>Ask the business question: what will you use the newly gained flexibility for—cost reductions, increased productivity, new products or services?</i>• <i>Better align sourcing of purchased services to business needs</i>• <i>Run a systematic process to compare vendors against both functionality and pricing</i>• <i>Watch out for hidden maintenance and support costs, as well as cost escalators</i>• <i>Ensure data security is protected, whether in a private cloud or shared cloud services – assess pros and cons of either approach</i>

The shift from investment in ICT assets to spending on ICT services happened at different times and speeds

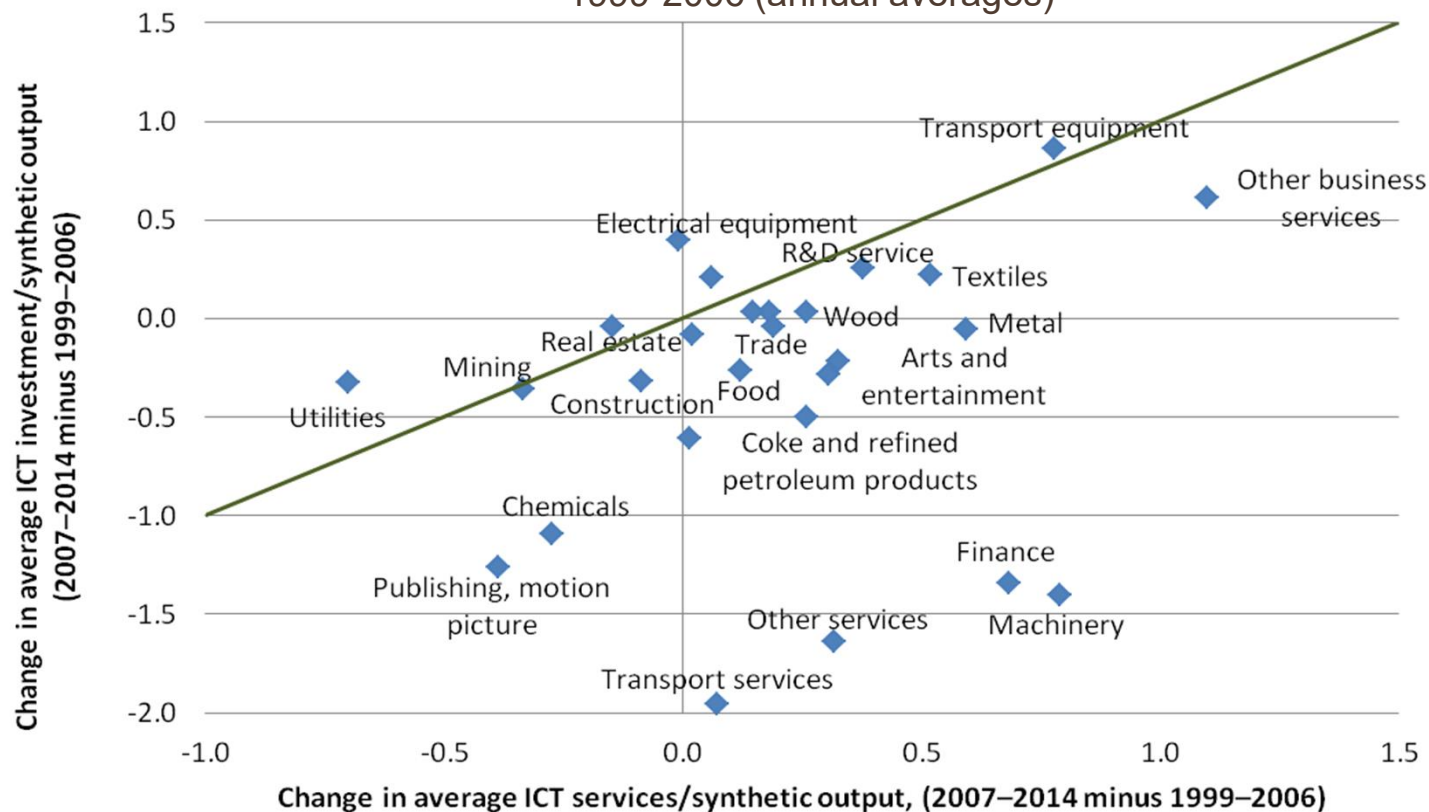
Computer services and ICT investment as a % of GDP



Source: Bureau of Economic Analysis; Eurostat; German Statistical Authority; EUKLEMS; The Conference Board

Most US industries are increasing their ICT service content more than their ICT investment

Change in ICT investment intensity and ICT service intensity in US industries, 2007-2014 minus 1999-2006 (annual averages)



Source: Bureau of Economic Analysis, The Conference Board

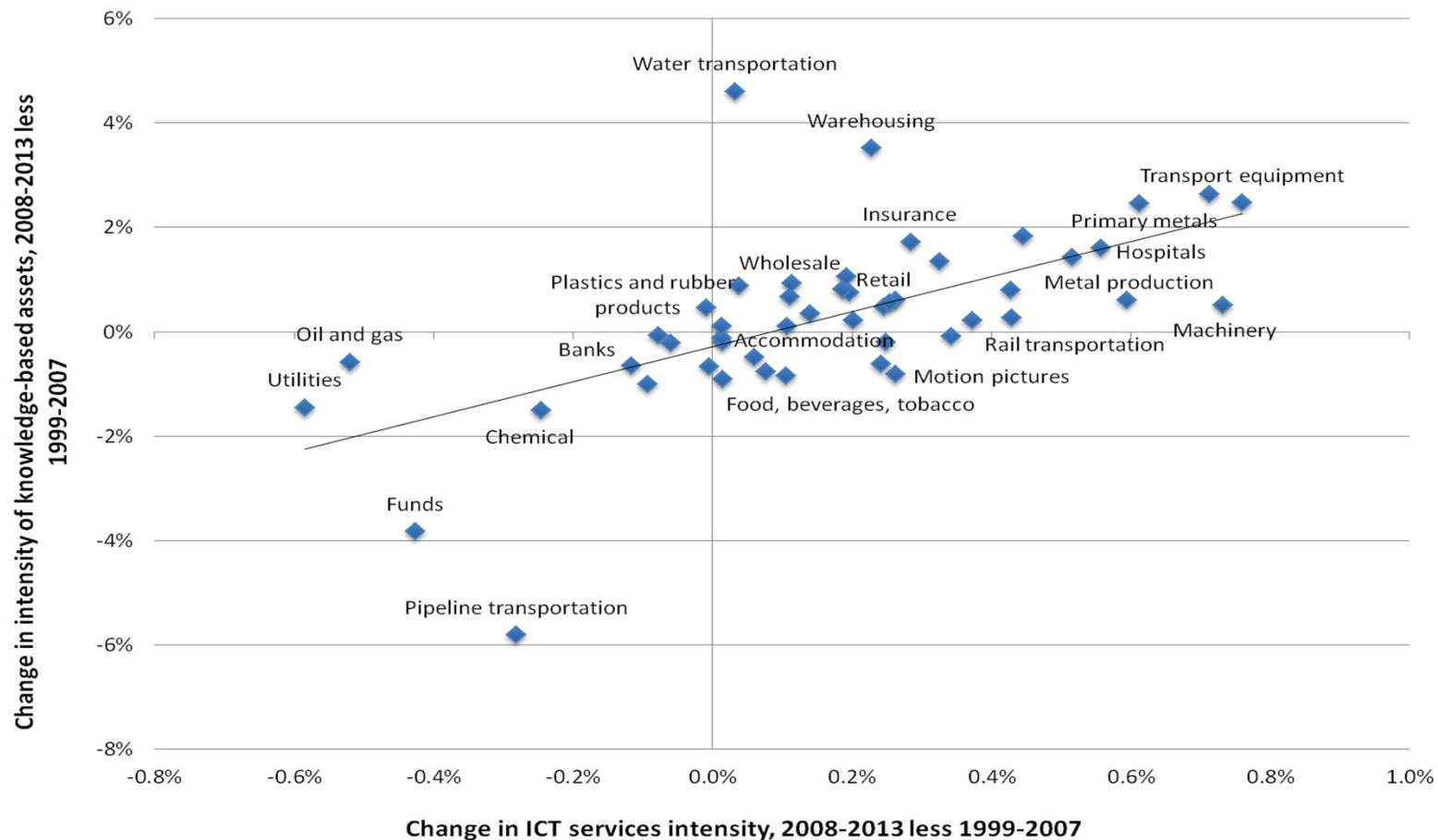
Note: Changes are measured as 2007-2014 (annual average) minus 1999-2006 (annual average)

3. Investments in knowledge-based assets (KBAs) are key to strengthen innovation capabilities

CHALLENGES	ACTIONS
<ul style="list-style-type: none">• Assessment of critical KBAs (product and services design, workforce training, and organizational innovations) complementary to ICT is key• A KBA strategy takes time to nurture, and to pay off in terms of better business results	<ul style="list-style-type: none">• <i>Assess the organizational requirements for innovative adaptations from ideation to execution</i>• <i>Focus on organizational assets that fully leverage the power of data analytics, notably those that drive collaboration across the organization</i>• <i>Learn from other organizations' key competencies in KBAs to support digital transformation</i>• <i>Assess renewal of KBAs that have become less relevant as internal IT infrastructure gives way to software development and data analytics</i>• <i>Improve measurement knowledge-based assets' contribution to value creation</i>• <i>Reallocate cost savings from ICT services to strengthen relevant KBAs</i>

Changes in Knowledge Based Assets and ICT services are complementary and together they drive innovation

Changes in intangible and ICT services intensity, United States, 2008–2013 relative to the 1997–2007 average



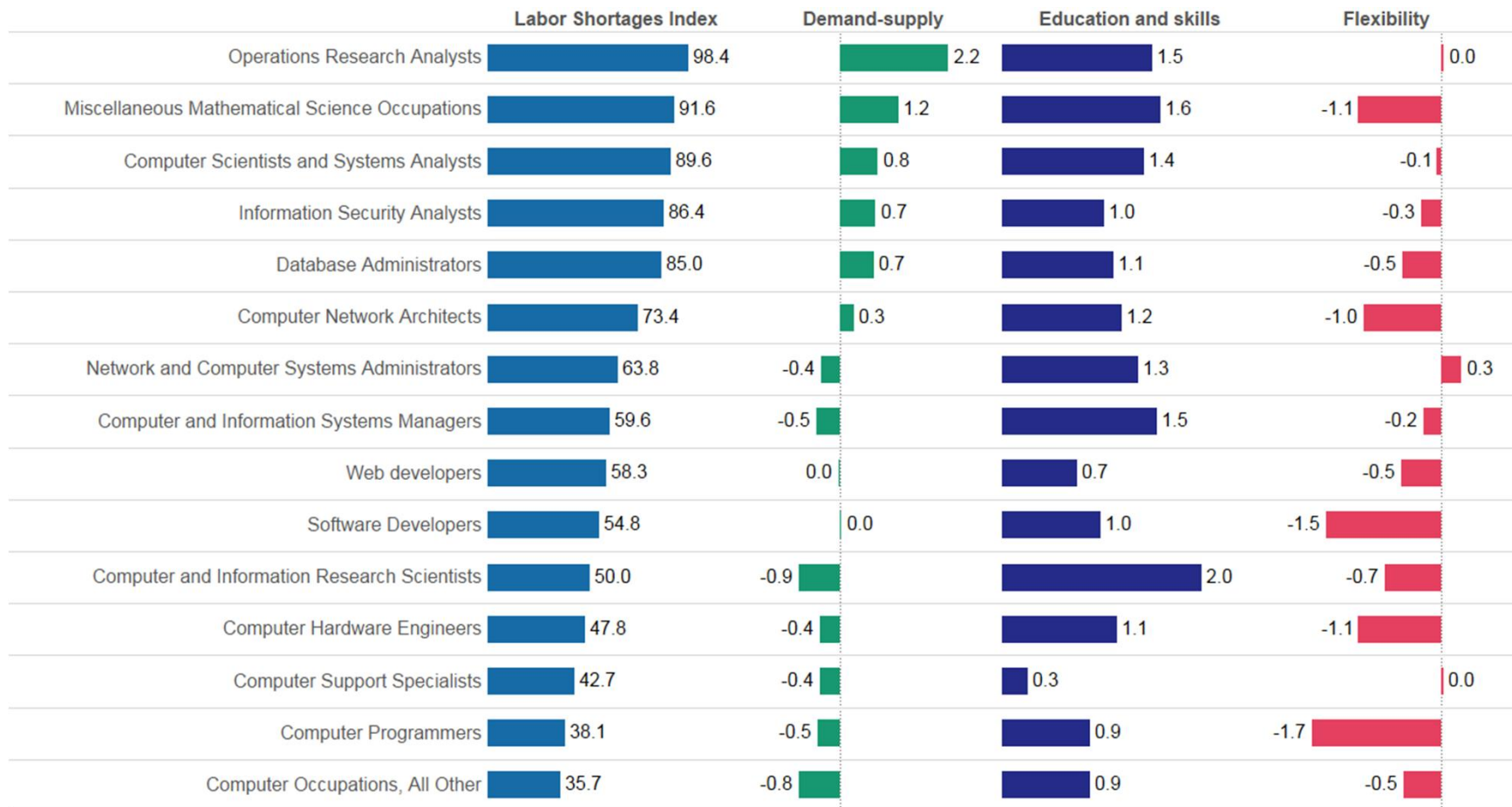
Note: Knowledge Based Assets refer to design, brand, organizational structure, firm-specific employee training, and management of companies

Source: SPINTAN, INTAN-Invest, Bureau of Economic Analysis, The Conference Board

4. The demand for digital jobs is rapidly increasing across the economy, and tech-savviness applies to everyone

CHALLENGES	ACTIONS
<ul style="list-style-type: none">• The skills in highest demand (statisticians, operations research analysts, web developers, and computer systems analysts) are the most difficult to obtain• Much of the rest of current workforce is not ready for digitization	<ul style="list-style-type: none">• <i>Firms must invest in digital talent to drive starting engines to obtain and employ digital services</i>• <i>Firms must understand skills that they have not considered as core in their operations before</i>• <i>Plan for much higher pay, better packages, and career paths for those with analytical skill that are in critically short supply.</i>• <i>For the majority of other occupations adopt a variety of strategies to create the rightly skilled workforce for your digitization strategy, including utilizing immigrant workers, telework, or offshoring</i>• <i>Consider alternatives, including consulting support, contract talent, and or managed services</i>• <i>Profile other organizations on best practices in hiring, training and retaining workers</i>• <i>Make company employees and vendors “leak proof,” as they are the main source of security lapses</i>

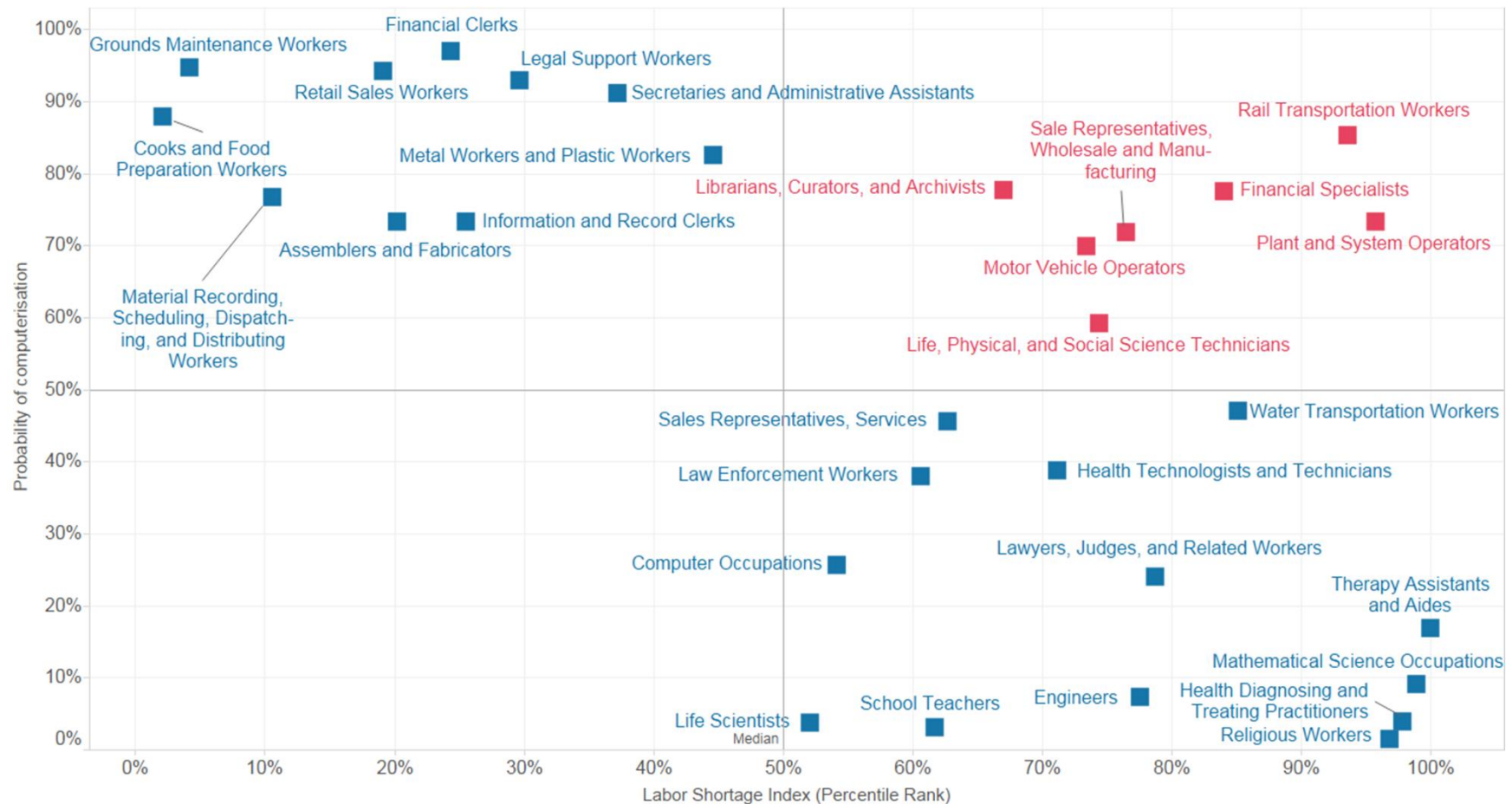
There is a large variation in digital labor shortages – calling for a wide range of different human capital strategies



Note: The labor shortages index is shown in percentile ranking, 50 percent being the median across all occupations. The three subindices are normalized to have average of zero and standard deviation of one.

Source: The Conference Board

There are different risks and opportunities for occupations in the New Digital Economy



Source: Frey and Osborne, *The Future of Employment: How Susceptible Are Jobs to Computerisation?* ; The Conference Board

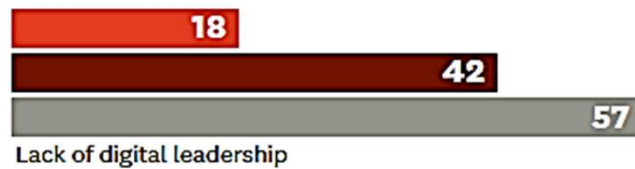
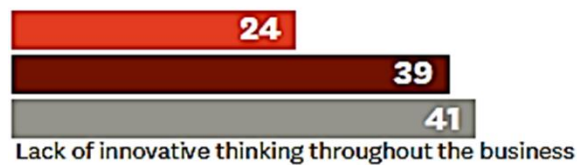
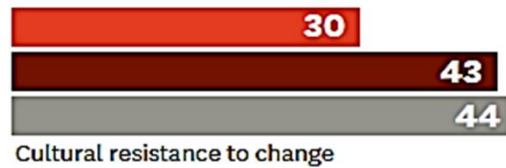
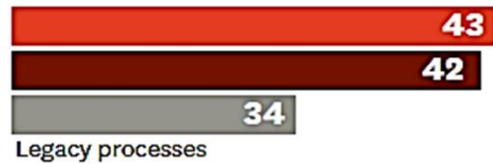
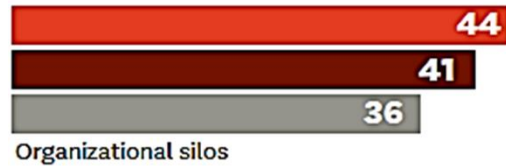
5. Collaboration and partnerships are critical to strengthen vertical integration and exploit industry convergence

CHALLENGES	ACTIONS
<ul style="list-style-type: none">• Synergies among many parties in the innovation ecosystem (business, education, research and government institutions) are time- and resource-intensive• Many variables are key to location decisions in the New Digital Economy	<ul style="list-style-type: none">• <i>Make internal and external collaboration a critical part of the digitization strategy</i>• <i>Work with suppliers, customers, and competitors to co-create vision and build new platforms</i>• <i>The creation of local innovation platforms to meet, collaborate and experiment in an open innovation environment is an important driver for co-creation of value</i>• <i>Improving the availability of educated workers through shared education and training programs via public/private partnerships can help relieve critical labor shortages</i>• <i>Easy access to startup and venture capital sources is key to innovation</i>• <i>Study different models of the innovation systems across geographies for strengths and weaknesses, and assess applicability to your own geographic area</i>• <i>Partnerships between business and government can experiment with policies to develop new markets and safeguard security, protection, and privacy</i>• <i>The classic “five forces” Porter analysis (assess competitive rivalry, the threat of new entrants, threat of substitutes, the bargaining power of suppliers, and the bargaining power of buyers) remains a good guide to success in the New Digital Economy</i>

KEY BARRIERS TO DIGITAL BUSINESS DEVELOPMENT

Percentage who said, when it comes to digital business, these are the primary issues holding their organization back. [CHECK UP TO THREE]

● LEADERS ● FOLLOWERS ● LAGGARDS



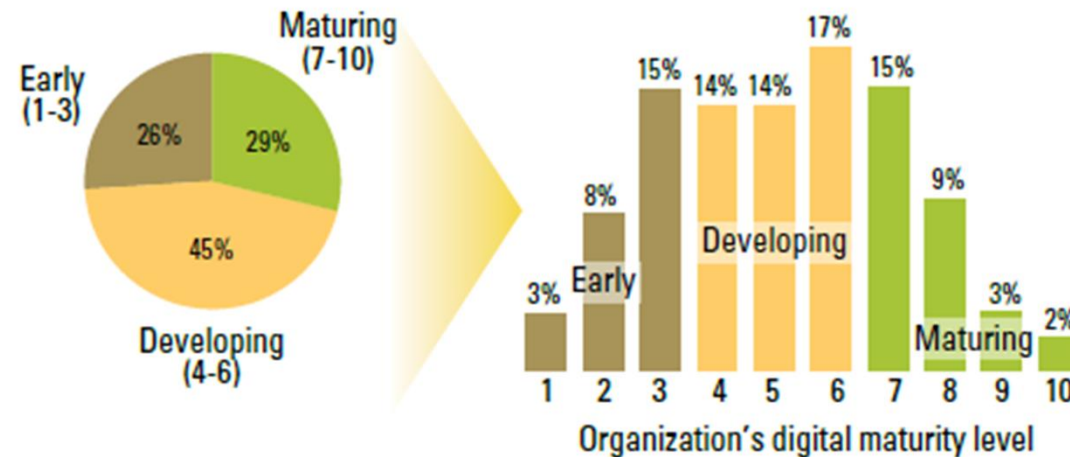
Source: *Driving Digital Transformation*, Harvard Business Review Analytic Services, 2015.

6. Agility and resiliency are key to respond to the disruptive forces from the New Digital Economy

CHALLENGES	ACTIONS
<ul style="list-style-type: none">• Disruption has many different faces ranging from cyber risk to new market entrants or communication challenges from social media• The awareness and preparation for risk and disruption needs to be organization company-wide	<ul style="list-style-type: none">• <i>Understand the sources of the headwinds in the economic environment (weak consumer demand; supply constraints; lack of investment or more specifically venture capital; restrictive government policy)</i>• <i>Create a culture of innovation, inclusiveness, and collaboration supported by effective team leadership, diversity of thought, and an emphasis on creativity and entrepreneurship</i>• <i>Systematic management practices (clear target setting, performance tracking, and rewards for high performance) show a strong relationship to higher productivity</i>• <i>Experiment and create culture for “failing fast” and iterate the way to success</i>• <i>Prepare for internal and societal impact of layoffs as jobs get computerized</i>• <i>Set up training and transition programs for those who can be reskilled and reemployed in new markets and applications</i>• <i>Put blueprints in place for internal and external security breaches, and test them</i>• <i>Seek collaboration with government (local, regional, and national) to carefully balance need for scale versus need for competition</i>

Only 30% of companies think they are maturing in the digital transformation process

FIGURE 1: To assess companies' digital maturity, we asked respondents to rate their company against an ideal organization — one transformed by digital technologies and capabilities — on a scale of 1 to 10. Three groups emerged: "early" (1–3), "developing" (4–6) and "maturing" (7–10).



Source: Strategy, Not Technology, Drives Digital Transformation, *MIT Sloan Management Review*, 2015.