Digitalization and the New Workforce Imperatives

Mark Muro Brookings Metropolitan Policy Program @MarkMuro1



Report Release Discussion December 7, 2017







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What we mean by "digitalization"

Digitalization is the process of employing digital technology and data to transform business operations and create value



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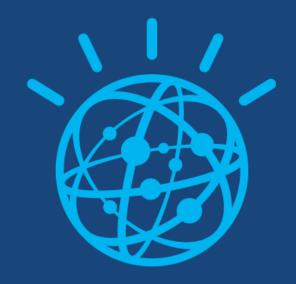


An explosion of digital tools is transforming nearly every industry





amazon webservices™

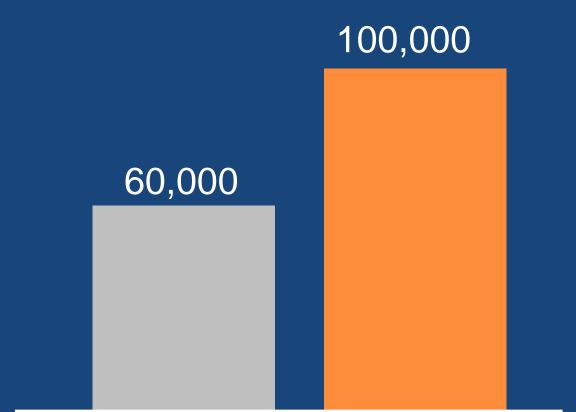






Challenges include an IT skills shortage and limited overall digital proficiency

Annual computer/IT college graduates versus U.S. labor market needs, 2014 - 2024



- Computer-IT college grads
- New workers needed in computer-IT industries

Source: BLS Presentation, 2016

Source: OECD



working-age Americans are unable to use email, web search, or other basic online tools

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How we analyzed digitalization

occupations

545



of the U.S. labor force

Two categories of **O*NET** digitalization data

 Knowledge of computers and electronics

Interaction with • computers



Software developers 94 **Electrical engineers** 77 Lawyers 58 **Mechanics** 55 **Registered nurses** 55 Security guards 31 18 Restaurant cooks 17 **Construction laborers** Personal care aides 14

We sorted occupations by high, medium, & low digital requirements

High (scores above 60)



Software developers



Medium (scores between 33 and 60)



Registered nurses



Office clerks

Financial Managers

Low (scores below 33)

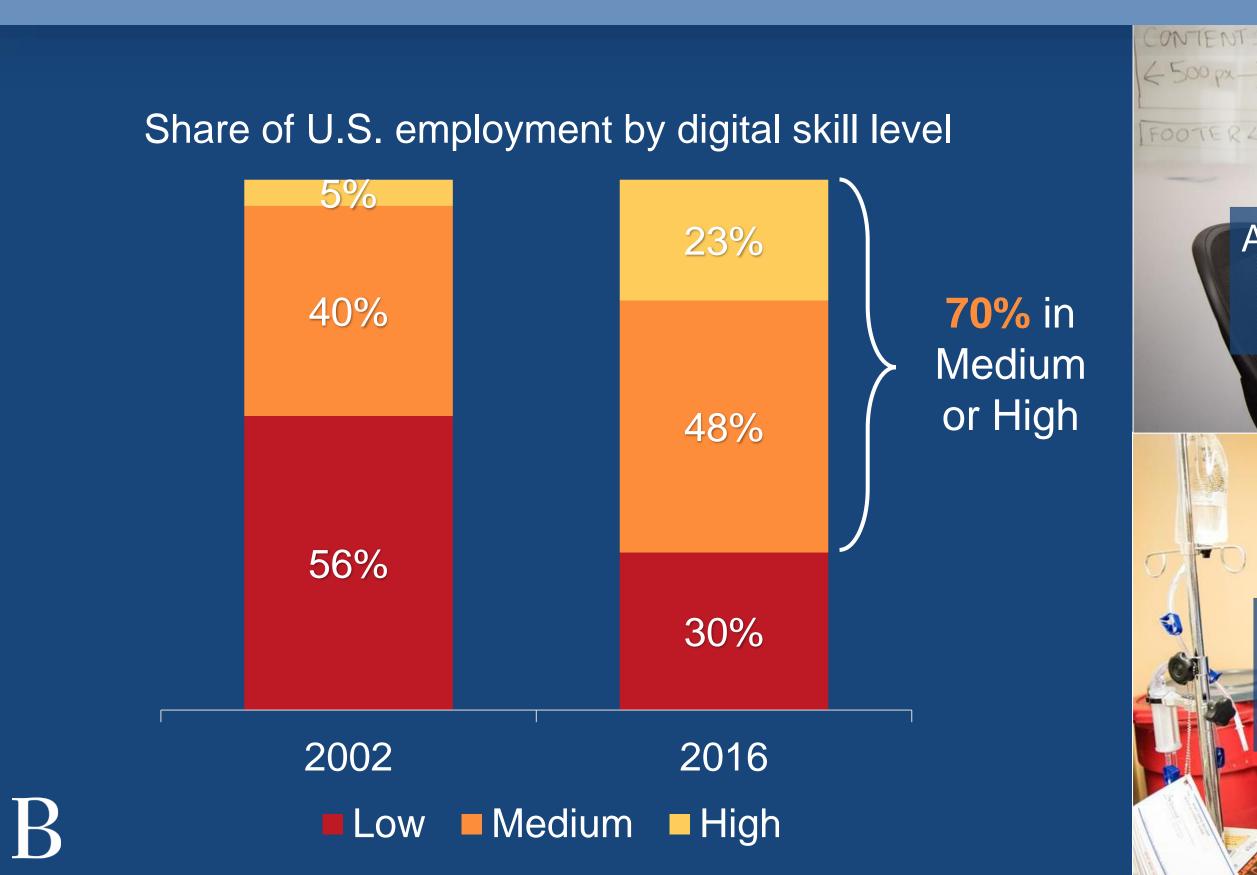


Construction laborers



Personal care aides

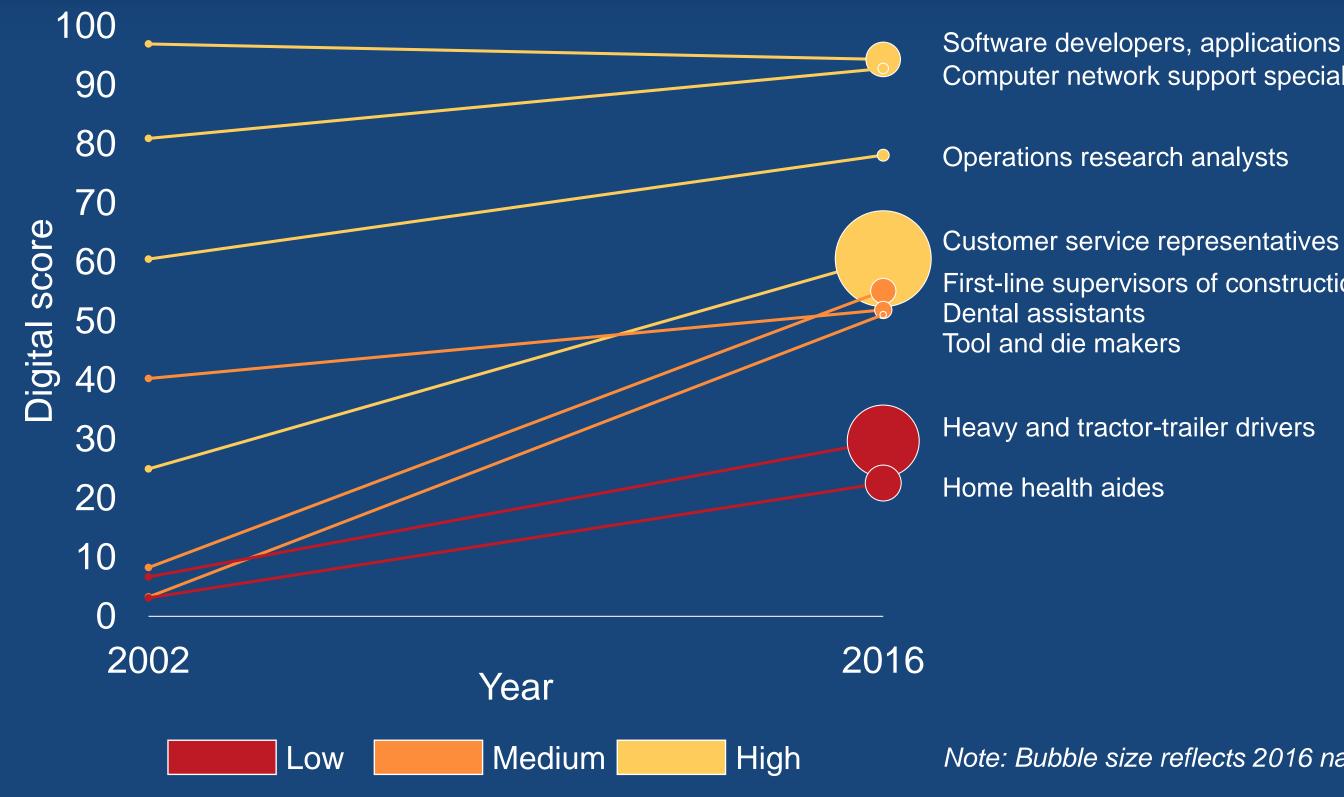
The share of jobs requiring high & medium digital skills has skyrocketed



Administrative support 39 64

Physician assistants 27 56

Low- and medium-digital occupations have been upskilling rapidly



- Software developers, applications Computer network support specialists
- First-line supervisors of construction trades

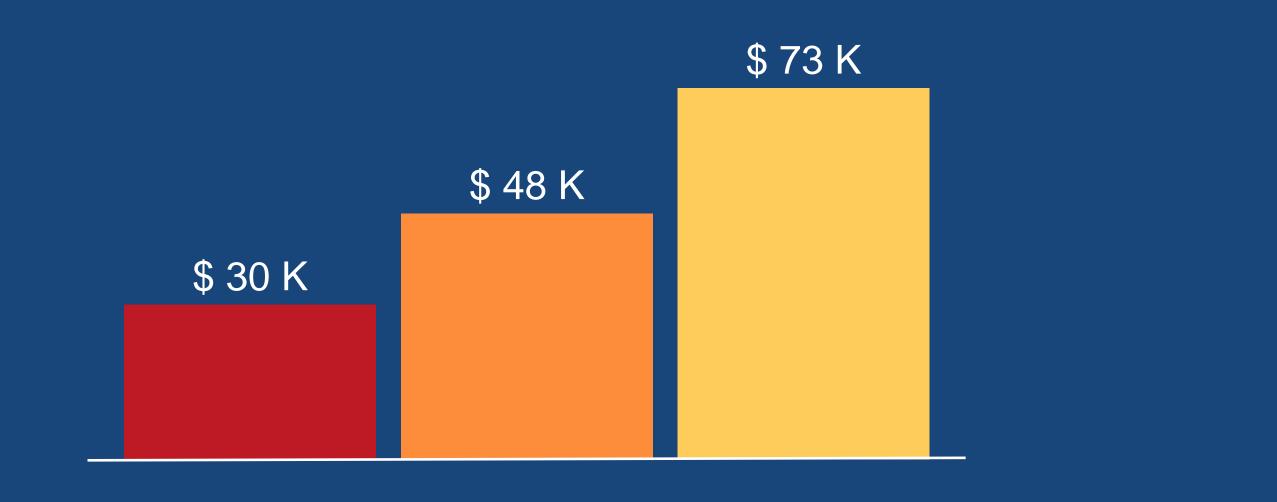
Note: Bubble size reflects 2016 national employment

Tech empowers: Digitalization brings higher wages

Average annual wage by digital score, 2016

Medium

Low



High

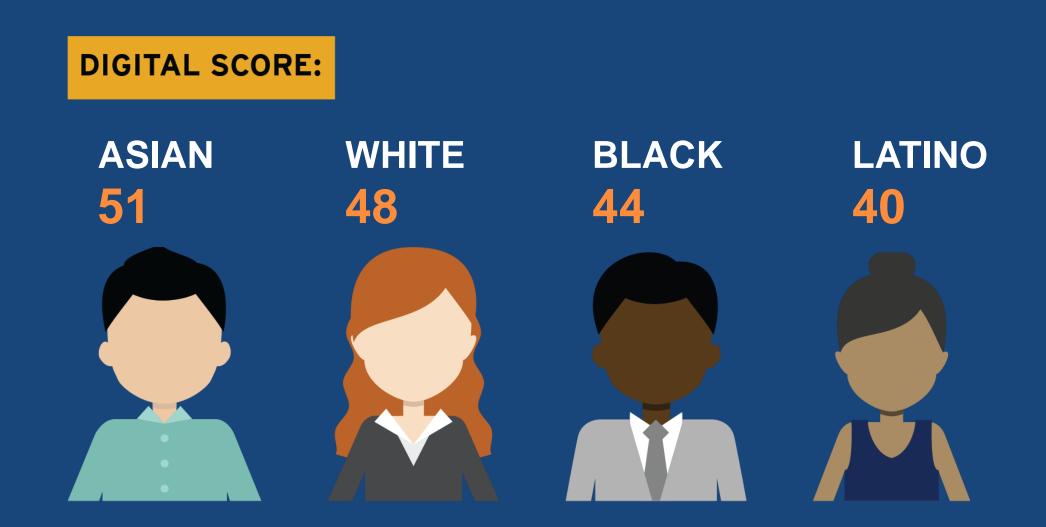


And tech contributes to industry productivity

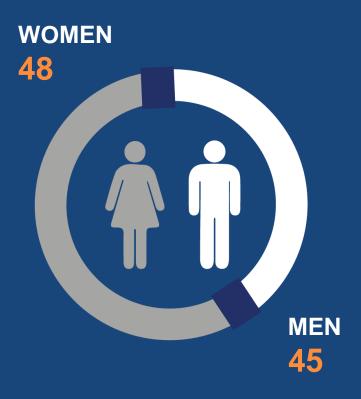
Industry group	Mean digita
	2016
Professional, Scientific, and Technical Services	55
Finance and Insurance	55
Media	52
Management of Companies and Enterprises	51
Healthcare services and Hospitals	46
ICT	44
Utilities	44
Oil & Gas Extraction	43
Educational Services	41
Retail Trade	41
Advanced Manufacturing	39
Transportation and Warehousing	33
Basic Goods Manufacturing	33
Construction	33
Nursing and Residential Care Facilities, and Social Assistance	32
Accommodation and Food Services	30

Avg. wage
CAGR, 2010-16
1.4%
1.8%
3.0%
2.2%
1.0%
4.8%
2.0%
-0.3%
0.0%
0.9%
0.9%
0.9%
0.8%
1.4%
0.9%
1.7%

Digital "know-how" is not, however, distributed evenly



B



Women remain underrepresented in highly digital occupations

Employment in select U.S. occupation groups by gender

	US Average					
Higher digital score	Computer and mathematical					
	Engineering					
	Management					
	Office and administrative support					
	Healthcare practitioner					
	Community and social services					
	Healthcare support					
	Transportation and material moving					
digital score	Construction and extraction					
	C	0%	^{25%}	50% ■ Men	75%	100%



Non-whites are disproportionately employed in low-digital skill jobs

Employment in select U.S. occupation groups by race

US Average Computer and mathematical Engineering Management Office and administrative support Healthcare practitioner Community and social services Healthcare support Transportation and material moving Food preparation and serving related Building and grounds cleaning/maintenance

score Lower digital score

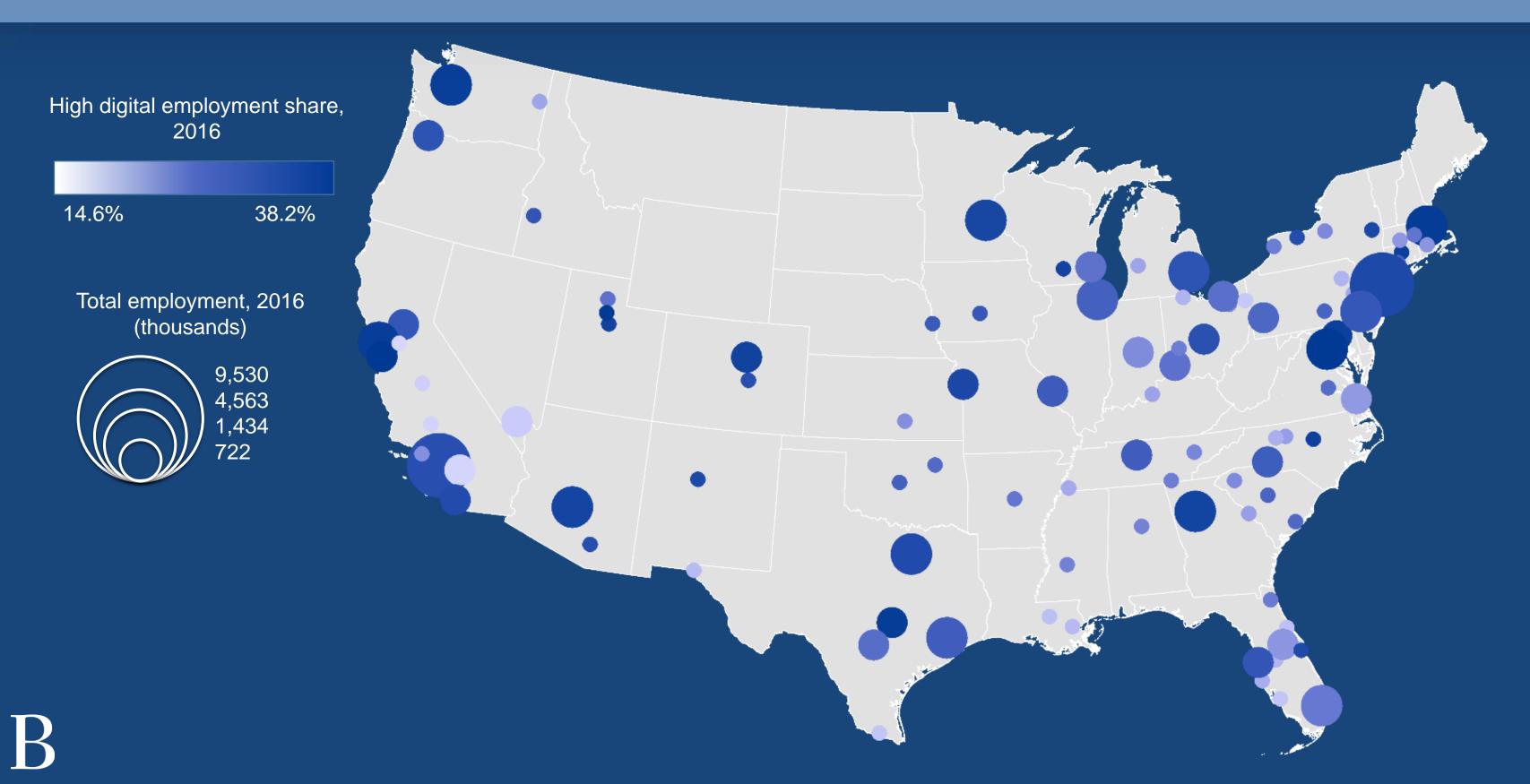
Higher

digital

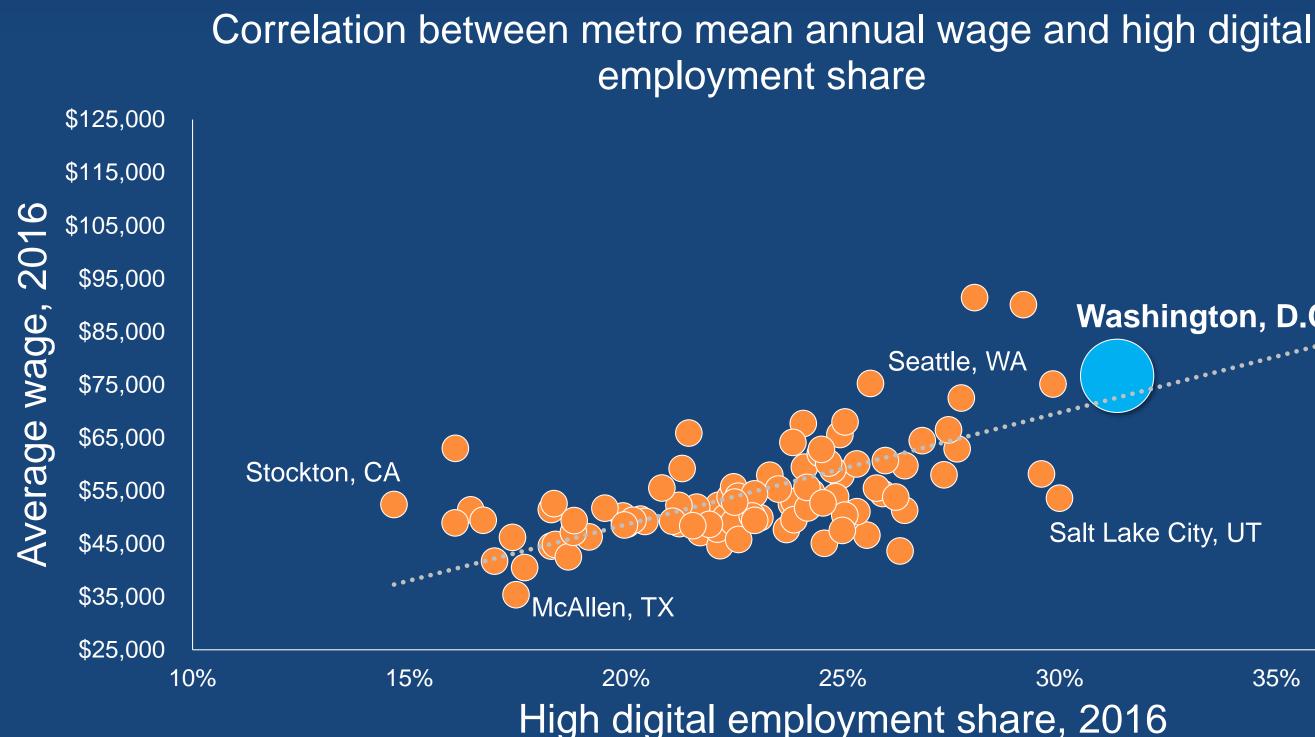
0% 25% ■ Black ■ Asian ■ Latino

50%	75%	100%
White		

Digitalization levels vary across U.S. metros



Higher metro digitalization is strongly correlated with higher wages



San Jose, CA

Washington, D.C. $R^2 = 0.4661$

Salt Lake City, UT

35%

40%

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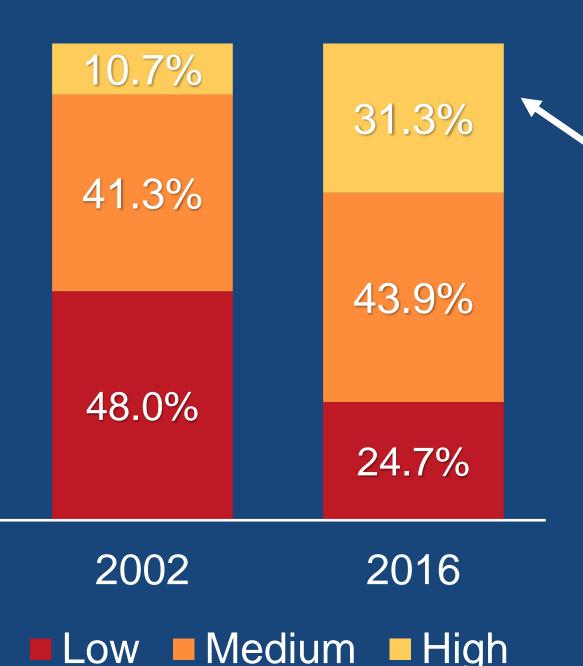
3 Implications for cities



The DMV is a digitalization hub



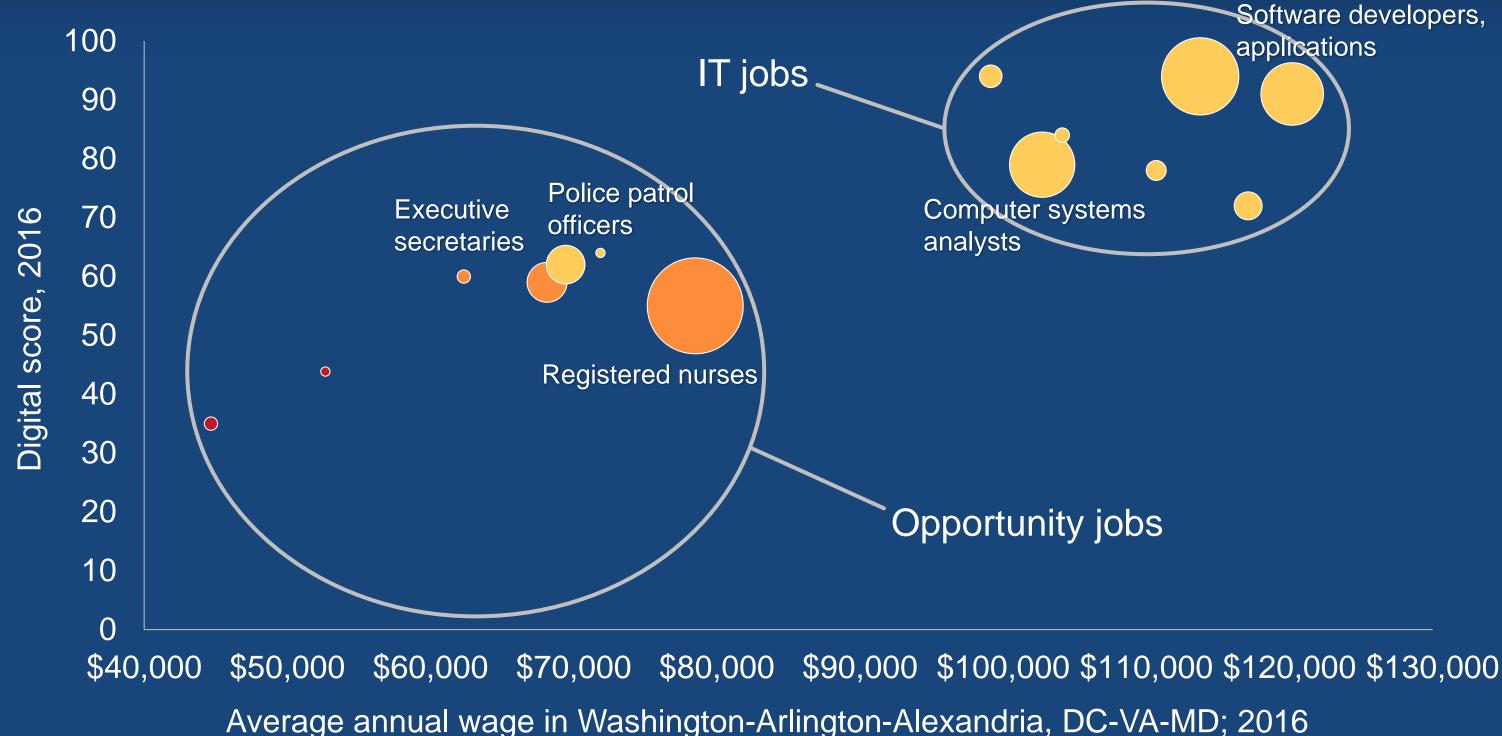
Employment in Washington, D.C. MSA by digital skill level



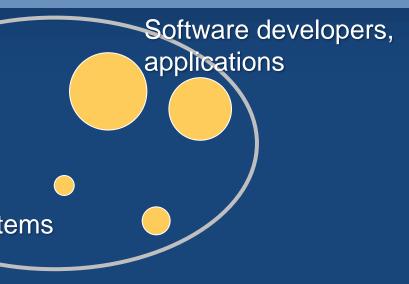


656,000 High digital jobs in 2016

DMV digitalization scores highlight two distinct issues

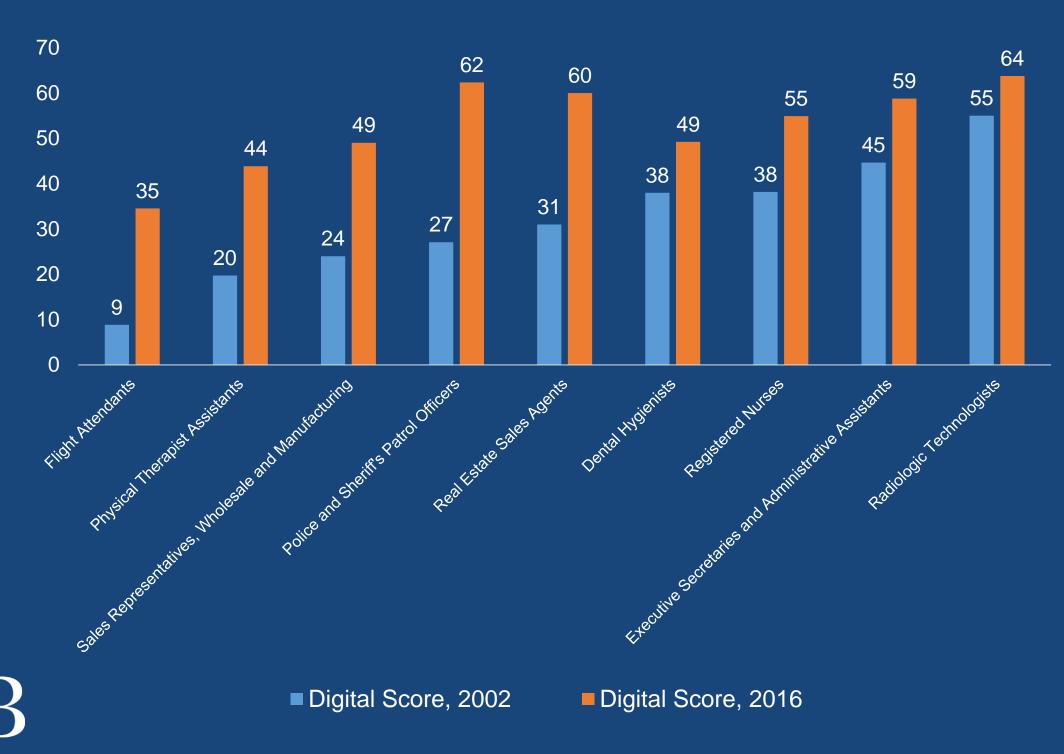


Note: Bubble size reflects employment in Washington-Arlington-Alexandria, DC-VA-MD in 2016; "Opportunity jobs" are occupations that do not require a bachelor degree but paid higher than the national mean annual wage in 2016



Key fact: On-ramps to middle-class careers are rapidly upskilling

Digital skill ratings for key on-ramp occupations in Washington, D.C.



Real estate agents 60

Sales representatives

49



The region should adopt two digital workforce training priorities

Expand and widen the high-digital IT talent pipeline 2. Increase basic digital literacy, especially among underrepresented groups

The region should adopt two digital workforce training priorities

Expand and widen the high-digital IT talent pipeline Expand aligned, relevant higher-ed feeder programs

 Scale up non-traditional accelerated learning models, experiences, and certifications

 Move toward universal K-12 CS exposure

The region should adopt two digital workforce training priorities

2. Increase basic digital literacy, especially among underrepresented groups Launch compelling digital literacy campaigns

 Scale-up exposure to basic office productivity tools in school

Expand entry-level tech training programs

Finally: Cultivate what is "uniquely human"

Emphasize adaptability, creativity, continuous learning, and social skills over rote information processing



For more information:

Mark Muro Senior Fellow mmuro@brookings.edu

@markmuro1

Metropolitan Policy Program at Brookings

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