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BSA Foundation

Software: Supporting US Through COVID

EXECUTIVE SUMMARY

The coronavirus pandemic presented challenges all across the US economy and Americans' lives in recent months. The response to the pandemic has featured tremendous tales of strength and agility, and, in many cases, those tales demonstrate what software makes possible in both the professional and personal lives of us all:

- By providing the infrastructure and services that enable remote work for many Americans, enterprise software firms have provided the backbone for much of the US economy in the past year.

- Healthcare providers and medical researchers leveraged software tools to improve patient care and help speed the development and distribution of new vaccines.

- Many workers have set themselves up at new desks in their homes, using software to remain connected and productive from outside the office.

- Businesses like restaurants and small retailers that can't go entirely virtual increasingly have turned to software platforms for ordering, sales, and other services that help minimize health risks.

- Shuttered schools have operated remote classrooms with students and teachers connecting from across their communities to advance their classwork.

- Software even fills our lives outside work by enabling entertainment options and social platforms that allow personal connections in our physically distanced world.

SOFTWARE SUPPORTING US

All across the United States in 2020, the COVID-19 pandemic transformed how Americans went about their daily lives—how we worked, how we learned, how we maintained connections with those most dear to us. The stories are all around us.

Connecting Students on Tribal Lands

When the pandemic closed the Casa Blanca school inside Arizona's Gila River Indian Reservation, school leaders turned to Intel and other firms for help. The Creating Learning Connections Initiative got every Casa Blanca student a new device and a broadband hotspot to allow distance learning—among the 17,000 devices, 7,500 education kits, and $200,000 for broadband the group distributed across the US.

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Just as software has supported businesses and individuals through the pandemic, it has played a key role in supporting the US economy. Software jobs and the industry's impact on US GDP have grown since 2018—even in the face of the tremendous challenges facing the overall US economy. In 2020, the software industry supported more than 15 million jobs nationwide in a broad range of sectors, an increase of nearly 6 percent since 2018. Direct software employment increased by 7.2 percent in the past two years, and the software industry's total contribution to US value-added GDP in 2020 grew by 17.1 percent in two years.

Looking more closely at software jobs: While the largest concentrations of the software workforce remain centered in the traditional tech hubs of California and Washington, software jobs for years have been growing fastest in other states. The growth of software

jobs is surging in states from New Mexico (direct jobs up 18.7 percent) to New York (12.9 percent), and Texas (10.9 percent) to Florida (10.1 percent).

And looking ahead, given the trajectory of software's spread through the overall economy and the pandemic-inspired spread of remote work, software jobs are poised for continued strong growth all across the country.

Consider: Much of the growth of software jobs comes as businesses outside the "technology sector" increasingly leverage the benefits of data and software to grow their businesses. Manufacturers, for example, are coding new solutions to optimize production, speed time-to-market, and deliver innovative products and services. Farmers are using software to maximize outputs and better manage their herds, utterly transforming

Providing Comfort for Patients

With patients looking for answers even as many doctors were forced to limit office access, Mercy Health in Missouri turned to Adobe to add a COVID-19 resource page to its website in a matter of hours. Patients could learn how to access in-person care even as Mercy protected patients and staff. The system also allowed Mercy to immediately contact patients experiencing coronavirus symptoms.
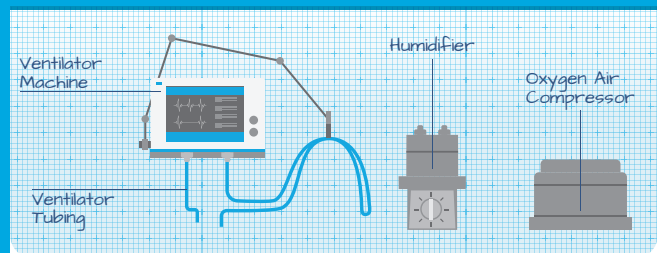
Addressing Ventilator Shortages

When a robotics startup company was put on hold in spring 2020 and the nation was facing a ventilator shortage, the company's founder and a global team of volunteers turned to Autodesk Fusion 360 to collaborate on a design for a new device in less than two weeks—and at a price that was a fraction of the cost of typical hospital ventilators.

KEY FINDINGS

The software industry continued to be a key driver of the US economy through the coronavirus pandemic, supporting jobs all across the country. In 2020, **software supported more than 15.8 million jobs in total**—an increase of 5.9 percent since 2018.

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Software supports jobs all across the economy—in industries far beyond just the technology sector. In 2020, **software supported more than 12.5 million non-software jobs**—up 5.5 percent since 2018.

In 2020, **3.3 million people worked directly in software jobs in the United States**—up 7.2 percent over 2018.

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Software contributed **$1.9 trillion to total US value-added GDP in 2020**—a 17.1 percent increase in two years.

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The software industry directly contributed $933 billion to the US economy in 2020—a 15.1 percent increase since 2018.

Software drives economic growth all across the country. Between 2018 and 2020, the software industry's economic impact grew by double digits in more than half of US states and the District of Columbia. In three states—Idaho, Nevada, and Washington—growth was up by more than 25 percent.

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By investing strongly in research and development the software industry supports continued future growth. The **software industry invested more than $103 billion in R&D in 2018**—more than 27 percent of all domestic business R&D in the United States.
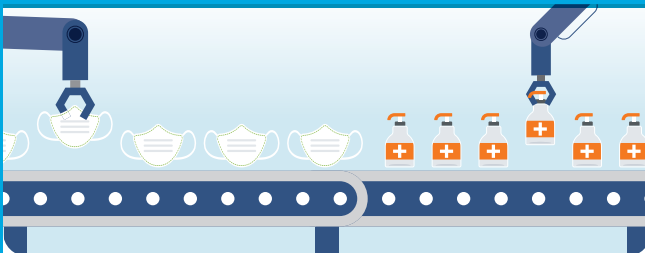
Pivoting to PPE Production

Mountain Productions, which normally builds elaborate stage designs for concerts and events, retooled its business to design modular medical structures and produce PPE by using Autodesk software. With concerts and public events canceled, the business set up a new division, redeployed its workers, and modified its structures to meet medical standards in a matter of days.
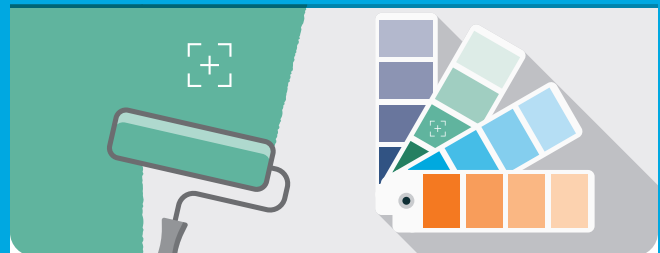
Transforming Customer Service

Pandemic shutdowns left many homeowners with lots of time for home improvement— but few chances to shop for supplies or get guidance on their projects. The makers of Behr Paint handled a surge in customer requests by leveraging IBM's artificial intelligence solutions to enable real-time, personalized dialogue with consumers and deliver a unique paint color recommendation for each user.

Helping Libraries Continue Lending

In an ironic twist for book lovers, the pandemic left many with lots of time for reading but no access to books. Many libraries ensured that patrons still had access to lending services by moving them online with Oracle software. The Library Corporation system gives readers the ability to search for "hands-free holds" or "library-to-go" catalogs and make appointments to pick up books.

Shifting to New Sales Models

With outdoor activities ramping up as many retailers were shutting down, Kent Water Sports in Washington turned to Microsoft's tools to transform their operations and sell directly to consumers. The changes allowed employees to easily access, manage, and share data and keep up with their customer needs. Even better, the company experienced a record sales year in 2020 and is set for future growth.

agriculture. In healthcare, electronic records and other innovations are improving medical administration and helping deliver a higher level of patient care. Those sectors—and the software workers who support them— are necessarily spread all across the United States.

In addition to this expansion of a wide range of new software jobs, businesses and policymakers must consider the newly discovered possibilities of remote work. The ability of traditional coders to take their skillsets out of high-cost tech hubs and work from far-flung home offices will dramatically alter the spread of the software workforce all across the country, a trend that will only increase as the pandemic recedes.

The numbers behind these and other trends are detailed in our fourth report working with researchers at The Economist Intelligence Unit (EIU) seeking to quantify software's economic impact on the US economy. In each of our previous reports—in 2014, 2016, and 2018—the EIU explored the state of the industry and demonstrated the enormous impact the software industry was generating throughout the country in both scale and scope. In this year's update, the EIU builds upon its earlier work with an analysis of the most recent data (from 2020) to quantify the breadth and depth of software's impact, and to show the rate at which these software opportunities are growing over time.

Growing to Meet a Building Demand

With families turning bedrooms into offices and dining rooms into schools, remodeling firms like Pennsylvania-based West Shore Home faced a huge increase in demand. That spike meant West Shore needed more salespeople, more designers, and more builders. Using Salesforce, the company could quickly pivot and scale up operations—from recruiting to sales—and grow revenue more than 100 percent.

Delivering Superior Care With Data

To quickly respond to COVID-19 outbreaks, New York-based Northwell Health turned to Oracle to help give patients the best care possible. Software helped Northwell better understand where and when their nurses are working, predict staffing needs, and care for a continually shifting number of patients. The secure system combines different datasets, enabling employees to better focus on patient care.

METHODOLOGY

In 2020, the Bureau of Economic Analysis, the official source of US economic data, made minor revisions to its 2015–2019 estimates for GDP. These updates are primarily due to improvements in underlying source data provided by various government agencies such as the US Census and Bureau of Labor Statistics (BLS). The BLS updates included similar revisions to employment and wage data for the same period.

To ensure comparability of results over time, The EIU has also revised the previous 2018 data/estimates to reflect these official updates. This has resulted in minor adjustments to the results of the 2018 study.

To estimate the total contributions of the software industry to the US economy, The EIU analyzed the direct contributions and estimated indirect and induced impacts using various economic multipliers:

- Direct contributions: the levels of output or employment of the industry in question;

- Indirect impacts: the inter-industry economic activity resulting from the direct contributions (e.g., purchases of inputs); and

- Induced impacts: the additional economic activity supported by spending on goods and services by households whose income were affected by the direct contributions and indirect impacts.

For more information on the report and a full discussion of the methodology, please visit **software.org/softwarejobs**

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STATE ECONOMIC IMPACT

State	EMPLOYMENT		GDP	SOFTWARE R&D	
	Direct (Jobs)	Total (Jobs)	Direct Value Added GDP ($million)	Investments ($million)	Percentage of Total Business R&D
United States	**3,337,009**	**15,843,318**	**$933,240**	**$103,357**	**27.4%**
Alabama	30,446	61,953	$4,568	$270	21%
Alaska	1,583	3,213	$291	$6	30%
Arizona	57,355	136,493	$10,426	$409	8.8%
Arkansas	12,680	17,304	$2,044	$105	24.8%
California	618,968	2,187,298	$269,475	$53,650	41.4%
Colorado	100,101	203,711	$23,078	$1,130	26.4%
Connecticut	31,892	114,917	$7,728	$185	3%
Delaware	5,673	13,654	$1,133	$39	2.7%
District of Columbia	31,063	70,469	$7,762	$159	57.2%
Florida	150,497	302,119	$31,097	$1,071	23.8%
Georgia	113,425	212,334	$23,268	$1,158	28.3%
Hawaii	5,071	16,499	$989	$24	27%
Idaho	8,183	24,623	$1,539	$36	1.5%
Illinois	117,417	404,184	$29,289	$1,224	10%
Indiana	35,987	73,130	$5,891	$191	3.2%
Iowa	17,557	37,146	$3,793	$212	8.3%
Kansas	21,240	43,855	$3,812	$325	19.8%
Kentucky	20,437	30,735	$2,947	$72	6.1%
Louisiana	14,599	29,345	$2,217	$45	12.5%
Maine	6,961	19,520	$1,399	$40	15%
Maryland	90,684	182,867	$17,775	$513	12.1%
Massachusetts	140,006	477,131	$40,292	$3,509	15.5%
Michigan	62,933	165,215	$13,573	$608	3%
Minnesota	50,814	87,024	$12,463	$840	12%
Mississippi	6,901	9,141	$1,041	$15	6%

STATE ECONOMIC IMPACT

State	EMPLOYMENT		GDP	SOFTWARE R&D	
	Direct (Jobs)	Total (Jobs)	Direct Value Added GDP ($million)	Investments ($million)	Percentage of Total Business R&D
Missouri	60,839	155,611	$11,423	$707	17.8%
Montana	5,510	10,176	$889	$42	26.8%
Nebraska	20,642	27,951	$3,749	$246	48%
Nevada	13,020	32,991	$2,875	$68	10.7%
New Hampshire	17,411	42,678	$4,005	$189	19.1%
New Jersey	91,646	306,605	$26,223	$805	4.8%
New Mexico	7,169	15,445	$1,230	$75	20.1%
New York	210,168	964,764	$82,209	$6,314	41.1%
North Carolina	90,772	218,283	$20,118	$2,068	26.5%
North Dakota	4,940	6,093	$923	$113	39.8%
Ohio	86,159	218,210	$16,271	$684	10%
Oklahoma	12,386	31,353	$2,879	$112	13.6%
Oregon	36,736	118,439	$9,836	$1,071	12.7%
Pennsylvania	98,099	303,441	$21,316	$1,144	10.8%
Rhode Island	8,805	18,427	$1,473	$19	2.9%
South Carolina	25,403	48,970	$4,368	$196	13.4%
South Dakota	3,298	5,434	$594	$16	8.9%
Tennessee	34,544	78,640	$7,053	$88	7.4%
Texas	277,988	526,167	$52,840	$2,845	15.6%
Utah	50,576	138,096	$9,948	$951	36%
Vermont	5,508	13,020	$1,117	$71	30.5%
Virginia	192,540	558,086	$38,446	$1,409	34.4%
Washington	175,796	610,149	$83,548	$16,758	56.8%
West Virginia	5,567	11,638	$980	$29	13.9%
Wisconsin	47,938	80,627	$10,675	$970	18.2%
Wyoming	1,077	4,024	$362	$7	20.6%

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UNITED STATES[1]

EMPLOYMENT

In addition to providing the digital infrastructure that enabled our personal and professional lives during the pandemic, the software industry helped create jobs all across the economy and all across the country. In fact, the software industry supports 12.5 million jobs in industries outside software—jobs in every economic sector. The total number of jobs supported by the software industry has increased nearly 6 percent since 2018. This report, from Software.org: the BSA Foundation and conducted in 2021 by The Economist Intelligence Unit (EIU), captures the positive economic impact of the software industry in the United States at the state and national level.

Total
15.8 million jobs
Direct
3.3 million jobs

GDP

Software played a crucial role in enabling our lives through the pandemic, allowing us to connect socially with friends and family. At the same time, software helped businesses of all sizes to continue their work, underpinning innovation and driving growth in nearly every economic sector. Overall, software's contribution to total US value-added GDP has grown more than 17 percent since 2018.

Total Value-Added GDP
$1.9 trillion
(includes indirect and induced impacts)[2]

Direct Value-Added GDP
$933 billion

WAGES

Average Annual Wage for Software Developers
$114,270[3]

R&D

R&D Investment by Software Companies
$103 billion[4]

27.4% of All Domestic Business R&D in US[5]

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[1] All data is from 2020 unless otherwise indicated.
[2] For definitions of "indirect" and "induced," see www.software.org/softwarejobs.
[3] US Department of Labor, Bureau of National Statistics, Occupational Employment Statistics.

[4] National Science Foundation/National Center for Science and Engineering Statistics and US Census Bureau, Business R&D and Innovation Survey. 2018 Industry breakdown.
[5] Ibid.

The EIU compiled these data and economic impact assessments using publicly available government data, maintaining full editorial control of the process and using industry standard approaches. Any views or opinions expressed in this document are not necessarily those of The Economist Intelligence Unit.