DEFINING THE ROLE OF GIG EMPLOYMENT IN THE POST-PANDEMIC WORLD OF WORK AND THE CURATED DATA ENTERPRISE

April 21, 2022

Joseph Salvo
Institute Fellow,
Social and Decision Analytics Division
http://orcid.org/0000-0002-1552-3387
ckp7gd@virginia.edu

Stephanie Shipp
Deputy Director and Professor,
Social and Decision Analytics Division
https://orcid.org/0000-0002-2142-2136
sss5sc@virginia.edu

Stephanie Zhang
Intern,
Social and Decision Analytics Division
https://orcid.org/0000-0001-9804-6522
sz3wr@virginia.edu

UVA | BIOCOMPLEXITY INSTITUTE

Acknowledgments: This report was funded by U.S. Census Bureau Contract Census Agreement No. 01-21-MOU-06.

Citation: Salvo, J., Shipp, S., Zhang, S. (2022). Defining the Role of Gig Employment in the Post-Pandemic World of Work. Proceedings of the Biocomplexity Institute. Technical Report 2022-026
https://doi.org/10.18130/wkx0-4y46

Abstract

Definitive estimates of gig employment, also known as alternative employment arrangements, vary widely depending on the definitions and sources used. Estimates range from a low of 15 million to a high of 55 million workers. As these estimates demonstrate, refining the definition of gig employment is challenging. Definitions include some mix of individuals who are paid by a temporary help agency or contract company or are on-call workers or independent contractors. The Bureau of Labor Statistics Current Population Survey's Contingent Worker Supplement (CWS) provides the lower bound for estimates (15 million). These data show little growth in alternative employment arrangements since 2005, likely because the survey's focus is on collecting data about an individual's main job. Other surveys and administrative data however have established that gig work is frequently undertaken to supplement income from a traditional job. As a result, official employment data greatly understate the level of gig employment and its increasing prevalence, especially during the pandemic. This is likely due to the inability of single-source surveys to provide data in anything close to real-time. To achieve a better measure, we must make use of multiple data sets derived from governmental and non-governmental surveys, and administrative data, especially if we are to fully understand the size and patterns of change in gig employment.

The Curated Data Enterprise (CDE) is both an infrastructure and a continuously evolving ambition to empower and enable Census Bureau scientists and their data users to develop together new measures of the nation's people, places, and economy.

The Curated Data Enterprise could facilitate research leading to a common definition and comparable reporting on the gig workforce. In this domain, we do not need to build from scratch, rather it can be informed by multiple studies taking an integrative approach. These studies combine CPS, General Social Survey, Internal Revenue Service administrative data, and smaller surveys conducted by research organizations.

No single data source will suffice to study the rise in gig employment and its many facets. The large number and types of data needed to assess gig employment are ideally suited for the CDE, a data enterprise capable of capturing purposes for data use, as well as the individual data assets themselves.

Defining the Role of Gig Employment in the Post-Pandemic World of Work and the Curated Data Enterprise

Introduction

While "gig" jobs have been around for generations, it is only in the last few decades that such employment has become a more mainstream part of the work world. Even before the pandemic, more traditional work in the form of a single job with a single employer – longer term – has given way to livelihoods that are based on shorter-term multiple jobs with more than one employer. The pandemic has accelerated this trend, as workers adopted alternative work arrangements in an effort to cope with its effects. Federal data -- by and large – has not kept pace with these changes. Official survey data do exist, along with administrative records; but these sources, by themselves, fail to capture current trends in the gig economy. It is only when these sources are integrated with alternative data from the non-profit and private sectors that a more comprehensive picture emerges about gig work; but even then, small area data are sparse. The Curated Data Enterprise can provide a framework for evaluating and integrating these data to create a picture of this increasingly important facet of the work world. In addition, this effort can help identify major gaps that need to be filled, if the data world is to provide policymakers with useful guidance.

Defining the gig economy: What is gig employment?

Suffice it to say at the outset that there is no universal, agreed upon, definition of gig work. References to gig jobs have been around for many decades, from the earliest references to "gigs" among Jazz musicians in the early 20th Century, to Tina Brown – the former Editor of The New Yorker – more formally coining the term in a 2009 interview as "a bunch of free-floating projects, consultancies, and part-time bits and pieces, while they transacted in a digital marketplace."[1]

What makes the measurement of gig employment so challenging is that its definition is continuously evolving, in concert with changes in the world of work and especially with advances in technology. The evolution of research on gig workers/occupations is instructive, because it not only reveals the changing nature of the concept, but also it reveals a whole host of difficult data and measurement issues that pose challenges for researchers.

There are a number of dimensions to gig employment, with no one characteristic being definitive. Consider, for example, the absence of any longer-term relationship with a single employer. Given the myriad ways persons are employed, however, this defining trait is hardly so. Better, perhaps, to define gig work as contract or project based, where the duration of employment is more of a temporary nature. Gig workers may not receive an IRS W-2 at year's end as most wage and salary workers do, but that too is hardly

[1] See https://www.npr.org/templates/story/story.php?storyId=100249858

definitive on its own. Finally, many gig workers do not have any form of direct supervision and may have flexible arrangements or scheduling.

Thus, the very definition of what it means to engage in gig work poses a dilemma for those engaged in efforts to measure and monitor its pervasiveness. But the definition developed by (Abraham et al, 2018:11) and shown in Table 1 below is among the most helpful: "… a gig worker is not paid a wage or salary, does not have an implicit or explicit contract for a continuing work relationship, and does not have a predictable work schedule or predictable earnings when working."

Table 1: Work Arrangement Types and Characteristics

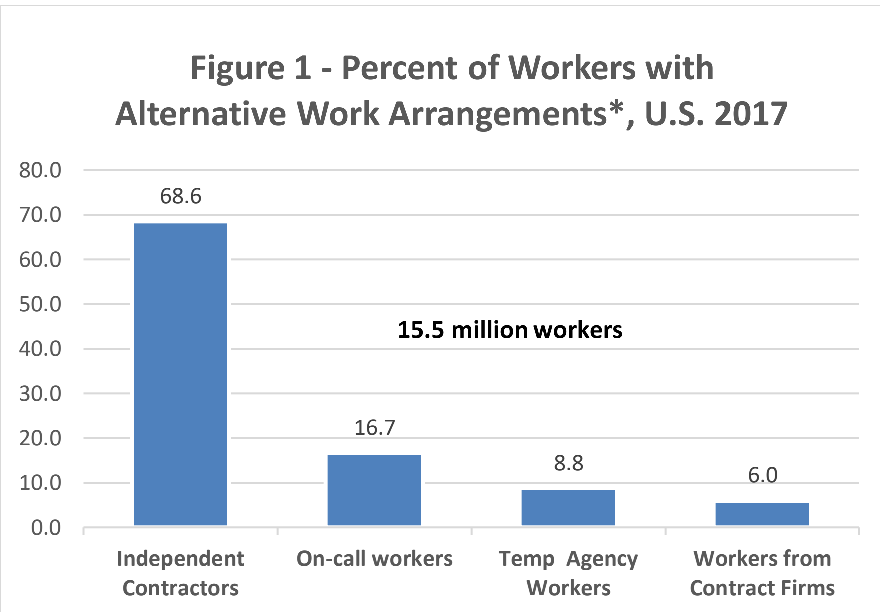
	Work Arrangement Characteristic					How Work Arrangement Reported			
Work arrangement type	**Paid wage or salary**	**Implicit or explicit contract for continuing relationship**	**Predictable work schedule**	**Predictable earnings when working**	**Work supervised by firm paying salary**	**Classified as self-employed in HH surveys**	**Information return on which payer may report earnings [1]**	**Tax schedules attached to Form 1040 for reporting earnings to IRS [2]**	**Gig worker?**
Employee									
Traditional employee	Yes	Some	Yes	Yes	Yes	No	W2	--	No
On-call/varying schedule worker	Yes	Some	No	Yes	Yes	No	W2	--	No
Direct-hire temporary worker	Yes	No	Yes	Yes	Yes	No	W2	--	No
Contract company workers									
Temporary help agency worker	Yes	Some	Yes	Yes	No	No	W2	--	No
PEO worker	Yes	Some	Yes	Yes	No	No	W2	--	No
Other contract company worker	Yes	Some	Yes	Yes	No	No	W2	--	No
Self-employed									
Business owners									
Incorporated business owner	Some	Some	Yes	Some	--	Inc. SE	W2, K1 or 1099	Sched E	No
Partner in a partnership	No	Some	Yes	Some	--	Uninc. SE	K1	Sched E, SE	No
Unincorporated sole proprietor	No	Some	Yes	Some	--	Uninc. SE	1099	Sched C, SE	No
Independent contractor/freelancer	No	No	No	No	--	Uninc. SE	1099	Sched C, SE	Yes
Day laborer	No	No	No	No	--	Uninc. SE	1099	Sched C, SE	Yes
On-demand/platform worker	No	No	No	No	--	Uninc. SE	1099	Sched C, SE	Yes

[1] Information returns are required to be filed with the IRS only by certain types of payers and only for payments that exceed certain thresholds. Depending on the arrangements under which they work, those receiving non-employee compensation could receive a 1099-MISC or, since 2011, possibly a 1099-K.
[2] Schedule E is used to report S-Corporation profits and distributions of patnership income. Some of the latter may be subject to self-employment tax. Unincorporated farm operators are required to file a Schedule F rather than a Schedule C. Individuals with incomes that are sufficiently low may not be required to file an income tax return.

Source: Abraham, et al, 2018.

The usual official sources of information on workers, such as the Current Population Survey (CPS), have been shown to be inadequate at defining this kind of work (Abraham and Amaya, 2018). This is especially true, given that many gig workers are multiple job holders, a topic not adequately covered in most federal surveys. Moreover, non-employee workers are sometimes miscoded as employees on government surveys (Abraham et al, 2019). Equally frustrating are the big differences that occur in the identification of income from self-employment associated with the gig economy, between administrative records and survey data (Abraham et al, 2021). Data sources vary widely, making the challenge of defining, monitoring, and evaluating gig work a tall order for any Curated Data Effort (CDE), but one where it may be particularly useful, in contrast to the reliance on single surveys and more one-dimensional thinking.

1. **How Substantial is gig employment?**
Definitive estimates of gig employment vary widely depending on the definitions and sources used. Most recently, Marty Walsh, the Secretary of Labor reported that upwards of 55 million persons or one-third of the total labor force, engaged in some form of gig work. However, based on work by the Bureau of Labor Statistics Contingent Worker Supplement (CWS) to the CPS, conducted in 2017, the estimate is much lower (U.S. Bureau of Labor Statistics, 2018). As part of this supplement, an estimate of persons engaged in A*lternative Employment Arrangements* was derived, based on a worker's relationship to an employer. Questions about whether a temporary help agency or contract company pay individuals, or whether they are on-call workers or independent contractors. All told, there were about 15.5 million workers engaged in Alternative Employment Arrangements in 2017[2], with the largest share (10.6 million) being independent contractors (Figure 1). Finally, the findings of this 2017 study show little or no growth in alternative employment since 2005, the last point of measurement.



*Primary Job Only
Source: US Bureau of Labor Statistics CPS Contingent Worker Supplement

The relatively small size and lack of change in alternative employment in the CWS have been attributed largely to problems in measuring what has come to be known as gig work. For one, as Abraham et al, 2019 indicated, some surveys such as the CWS focus on a

[2] This research also identified "contingent workers," persons who do not expect their jobs to last or who report that their jobs are temporary. In May 2017, about 5.9 million persons held contingent jobs. Many of these workers are wage/salary employees hired on a temporary basis, these are not a focus of attention in this case study.

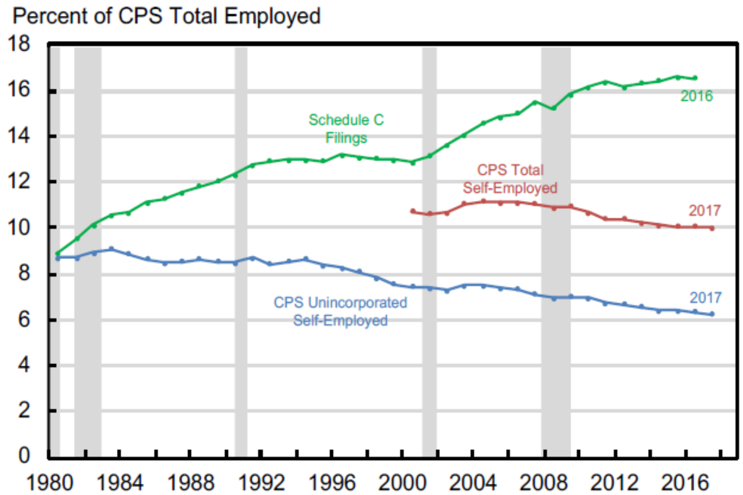
person's main job -- where one works the most hours. Yet surveys and administrative data have established that gig work is frequently undertaken to supplement income from a traditional job, which greatly understates the level of gig employment and its increasing prevalence.[3] This makes the use of multiple data sets derived from governmental and non-governmental surveys, and administrative data a must for estimating the size and patterns of change in gig employment. Such an integrated approach is increasingly seen as the only way to define and monitor the gig world (Abraham et al, 2019). And, using such an approach, the consensus is that gig employment has increased substantially over the past decade. One such study by the Aspen Institute using data from the National Opinion Research Center's (NORC) General Social Survey, along with a variety of government sources, actually found substantial increases in Independent Workers between 2002 and 2014, especially among those working part-time and those laid off as a result of the Great Recession (Holtz-Eakin et al, 2017).

Perhaps the best example of an integrated approach can be found in Katz and Krauger (2019), using a combination of CWS/CPS Surveys for 1995 to 2017, the 2015 RAND-Princeton Contingent Work Survey, and 1099 filers from the Internal Revenue Service for 2000 to 2016. They concluded that there was indeed an upward trend in the share of the U.S. workforce engaging in alternative work arrangements. One of the most striking parts of their analysis is the divergence of estimates from those based strictly on surveys, showing no change or declines in the number of gig workers, compared with substantial increases when using administrative records from the IRS (see Figure 1 below). Again, at least part of this is due to the to the inability of survey data to tap multiple job holders and, in addition, the underreporting or misreporting of self-employment income. Thus, estimating the size of the gig workforce solely from single-source official surveys is not a very useful approach, given the importance of non-governmental surveys and administrative data for a complete picture.

Another but more indirect source of information on gig employment consists of data on non-employer firms, collected by the U.S. Census Bureau and other agencies, such as the Federal Reserve (Corcoran, et al, 2021; U.S. Census Bureau, 2020). Non-employer firms have no employees, other than the owner of the business. These constitute the large majority – more than 80 percent -- of all small businesses. While the growth of these businesses is not a definitive measure of the proliferation of gig work, this is one important path for many who seek a livelihood in gig employment. And, the data below show the steady increase in non-employer firms between 1998 and 2018. Moreover, there has been an increased effort at the federal level to learn more about the characteristics of these business owners (U.S. Census Bureau, 2020). One such study of Taxi and Limousine drivers showed a huge increase between 2013 and 2016, from 224,000 to over 700,000 business owners, with a marked change in characteristics (Sandusky, 2018). Much of this increase was the result of part-timers starting businesses in an effort to supplement income, in many cases from a full-time job.

[3] For an extensive review of the CWS and recommendations for its enhancement, see: National Academies of Sciences, Engineering, and Medicine (2020).

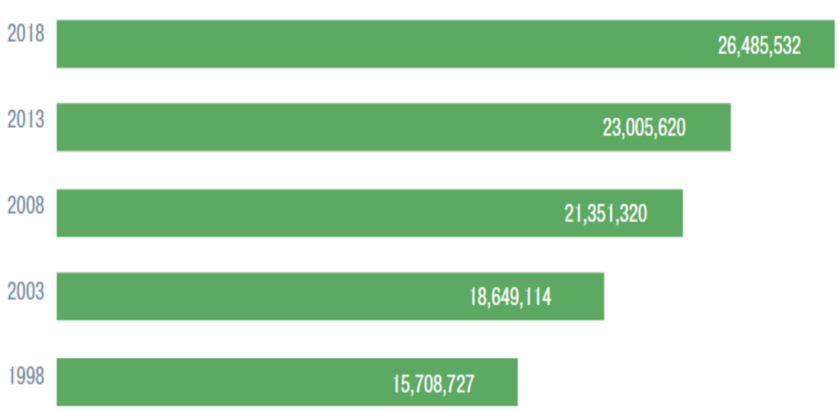
Figure 1: Trends in Self-Employment



Sources: Self-employment measures from Current Population Survey and Schedule C Filings from IRS Statistics of Income Publication 1304, Table 1.3.

Source: Katz and Krueger, 2019

NUMBER OF NONEMPLOYER FIRMS[3]



1 Data for small employer firms is sourced from US Census Bureau's Statistics of US Businesses. Data for nonemployer firms is sourced from US Census Bureau's Nonemployer Statistics.
2 Small employer firms are businesses with 1–499 employees.
3 Sourced from US Census Bureau, Nonemployer Statistics.

SMALL BUSINESS CREDIT SURVEY | 2021 REPORT ON NONEMPLOYER FIRMS 1

Source: Corcoran et al, 2021.

In addition to the examination of existing federal surveys and administrative records, there are a whole host of data compiled by Think Tanks, Non-Profits, and Private Corporate sources. These datasets provide yet another means of exploring the apparent increase in the gig workforce.

The McKinsey Global Institute (2016), focused on "Independent Workers" similar to the definition by Abraham, cited earlier, as part of an international survey of more than 8,000 workers:

1. *A high degree of autonomy*: Independent workers have a high degree of control and flexibility in determining their workload and work portfolio.

2. *Payment by task, assignment, or sales*: Independent earners are paid by the task, assignment, contract, or the volume of sales they make. Unlike salaried employees, they are not paid for time not spent working.

3. *Short-term relationship between the worker and the customer*: Independent earners perform short-term assignments, such as giving someone a ride, designing a website, treating a patient, or working on a legal case

Using this definition, as of 2016, they estimated that between 22 and 27 percent of persons of working age, or between 54 to 68 million persons derive earnings from independent work – either as a primary or supplemental source of earnings (McKinsey Global Institute, 2016). Using similar definitions, more recent estimates have been prepared by MBO Partners for Independent Workers as of July 2021 (51 million), and *Upwork* for Freelancers as of June 2020 (36 percent of all workers or 59 million).

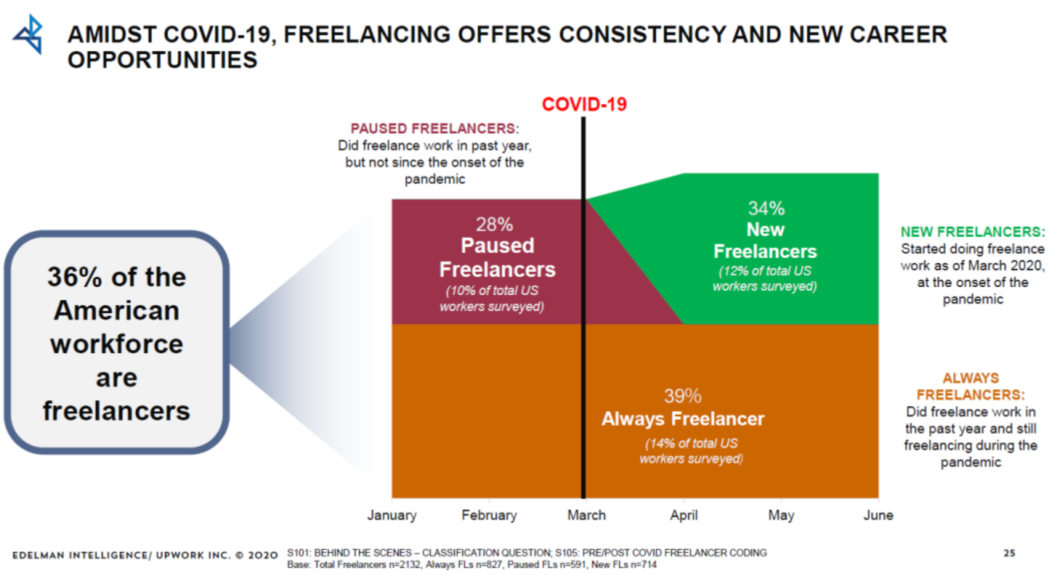
2. The Impact of the Pandemic

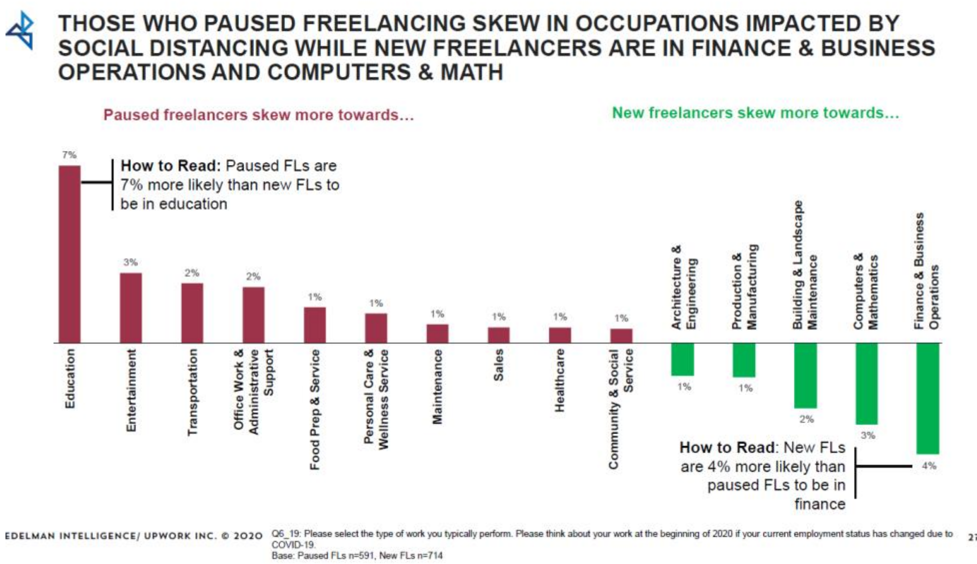
Much of the research on the size of the independent worker population has increasingly focused on the proliferation of digital platforms, as a means of increasing independent employment. Nowhere in time has this change made so much of a difference than in the era of the 2020 pandemic. In fact, some argue that, while remote work was viewed with a heavy dose of suspicion before the pandemic, it has now become the norm as a result of the pandemic, at least in the more highly skilled occupations (Fuller et al, 2020). It hastened the transition to on-demand workforce models and the adoption of digital technologies and platforms (International Labour Office, 2021).

The pandemic "jump-started" independent work for several reasons, according to a number of non-governmental surveys: 1) a re-evaluation of the world of work; 2) the need for supplemental income; 3) the new meaning of risk and security; and 4) the proliferation of online platforms that made independent work more viable and desirable (MBO Partners, 2021).

Improvements in access to digital platforms have enhanced remote work but access to this technology and to the opportunities it portends is not even across occupations and industries. Some workers had to pause their activities during the pandemic, such as those in transportation, food preparation and service, and personal care. An Associated Press-NORC poll found that 42 percent of the population reported using a ride-hailing service (e.g., Uber, Lyft) before the pandemic; that dropped to just 16 percent during the pandemic (AP-NORC Center for Public Affairs Research, 2020). Similarly, the Federal Reserve found declines in the number of hours and earnings from gig employment between 2019 and 2020 among workers involved in child care, house cleaning, ride-sharing, selling goods, and renting property (Federal Reserve Bank, 2021). Still, gig employment did offset lost work from more traditional jobs.

It is instructive to look at the status of workers during the pandemic, according to a 2020 *Upwork* survey, shown below (Upwork, 2020). Of the workers who reported engaging in Freelance work during the pandemic, 39 percent continued with their gig work during the pandemic, another 28 percent could not continue and had to pause their work. Finally, more than one-third became new Freelance gig workers during the pandemic, which is an indication of opportunities that were pursued anew. Most of the latter were in occupations that require higher levels of skill and education, while those that paused -- very predicably -- were in occupations where "place" matters and remote work is not an option. And, most of the new freelancers worked remotely, taking advantage of the digital platforms that have become increasingly available.





Most important, these changes in the workforce do not appear to be temporary, in that a majority of workers indicated the desire to continue with gig work, expressed a high degree of satisfaction with the independent worker model and demonstrated a preference to continue pursuing such work (MBO Partners, 2021). The increasing preference for "being your own boss" is, perhaps, best illustrated in the well-documented growth in non-employer firms over the last decade, shown earlier. These results are not new, as a 2017 Gallup Poll showed a preference for independent work, although sizable numbers also reported that such arrangements were out of necessity and new economic realities (Gallup, 2018). With the pandemic, a reassessment of worker roles and changes in the workplace have made the trend to independent work a more prominent feature of the workplace. Suffice it to say that the combination of remote or hybrid work models, combined with the proliferation of online platforms (see examples below), have increased the possibilities substantially for those seeking gig work, either as a full-time livelihood or as a supplement to traditional employment.

Major Companies in the On-Demand Economy

Name	Field	Size of Workforce	Operating Areas
Uber	Transportation	160,000[i]	International
Lyft	Transportation	50,000[ii]	U.S.
Sidecar	Transportation	6000[iii]	Major U.S. Cities
Handy	Home Services	5000[iv]	U.S.
Taskrabbit	Home Services	30,000[v]	International
Care.com	Home Services	6,600,000[vi]	International
Postmates	Delivery	10,000[vii]	U.S.
Amazon Mechanical Turk	Crowdwork	500,000[viii]	International
Crowdflower	Crowdwork	5,000,000[ix]	International
Crowdsource	Crowdwork	8,000,000[x]	International
Clickworker	Crowdwork	700,000[xi]	International

Source: Smith and Leberstein, 2015

The ability to work remotely and the fact that these jobs are disproportionately at the higher end of the socioeconomic spectrum, has made for an unevenness in opportunities for success and created a whole series of ethical concerns about workers' rights and protections that has become the subject of considerable research in the U.S. and internationally by the OECD and the International Labour Organization (De Stefano, 2016; Ustek-Spilda, 2020). Gig employment raises all kinds of social equity issues, given the varied nature of this employment, ranging from well-paid freelance work in technology to work that is the high-tech equivalent of "piece work" in the sweatshops of yesteryear (Semuels, 2018). A crisis of sorts was instigated by the pandemic, given the fact that most low-income workers do not have the option to work at home, leading to concerns about exacerbating inequality in the workplace (see below). In fact, these concerns have given rise to the establishment of principles governing this form of work (Fairwork, 2021).

Percent of workers with the ability to work from home by income percentile, 2018
(Bureau of Labor Statistics)

Income percentile	Percent
Bottom 25	9.2%
25-50	20.1%
50-75	37.3%
Top 25	61.5%

Source: Adapted from Gamio, 2020.

3. The Rise of gig Employment and the Curated Data Enterprise (CDE): A Research Roadmap

a. Curating Data on gig Employment

Content Curation usually refers to a process where data are selected, organized, and integrated as a means of adding value to an understanding of what the data represent. Such an enterprise relies on expertise in understanding the needs of the data user community and consensus on the data that are most useful towards an understanding of the role gig employment plays in local labor markets. To do so will require an integration of a large number and variety of data sets which, when put together, will produce an understanding that is greater than the sum of its parts.

The volume and diversity of data sources that can be used to define, monitor and evaluate gig work and its impact on changes in work is overwhelming. No single data source will suffice to study the rise in gig employment and its many facets. The large number and types of data needed to assess gig employment pose big technical challenges for any curation effort because these data need to be evaluated. In the case of survey data, sample selection, weighting, post-stratification adjustments and the utilization of controls from other sources must all be evaluated and the limitations assessed.[4] Administrative records -- which by definition are not created for statistical purposes – need to be evaluated for completeness, coverage, and representativeness. And, all of this takes place in an environment where access to the details of collection and processing of data may be restricted, due to respondent confidentiality or the proprietary nature of certain data products by the private and/or non-profit sectors. Therefore, in addition to the technical issues that need to be addressed, any research roadmap needs to identify ways of cultivated partnerships that will result in access to the information and data required for a proper assessment. But, first it is important to identify the datasets that are most relevant for the task at hand by getting a handle on the products the CDE seeks to produce.

b. Starting with the End Products

The goal of the CDE is to produce useful products for the decision makers who are formulating policies, designing programs, and implementing strategies for business and economic development. One goal of the CDE is to offer information on gig employment to inform those decisions. Using information from the *Listening Sessions* and from the literature, there are several important questions the CDE needs to address:

- How does a state/local agency or non-profit organization get a handle on the level and type of gig businesses and employment that currently exists in their area? How important is gig work to the economic outlook?
- How does a state/local agency or non-profit organization build a series of data points that will help serve as a foundation for forward-thinking policies to enhance and support gig work? How important is it to the community to promote gig work? Are policies to do so needed and in the interest of the local community?
- How does a state/local agency or non-profit organization establish policies that are grounded in the data, that promote fairness and social equity? Given differences that exist in access to gig employment, how can an organization act to promote responsible business and economic development across racial and economic lines?

c. Needed Research: Ten Paths

With these questions in hand, a path for research can now be identified – one that will lead to the development of data that will serve as a foundation for decision making. Key research questions now emerge:

[4] This is especially true, given the fact that the content of different sample surveys may vary, but they may be linked by way of their use of large government datasets (i.e., decennial census) for their weighting and non-response adjustments.

1. What are the appropriate universes of study and what is the appropriate unit of analysis for each?
2. What characteristics of existing non-employer businesses or workers are most relevant for local decision makers?
3. What level of geographic detail and/or subpopulations are most relevant?
4. What survey data will be of use for framing the current state of gig employment for decision makers at state and local levels?
5. What mechanisms exist for monitoring and projecting gig employment by industry, and could potentially serve as the basis for looking forward and building a strategic plan?
6. The samples used for many of the surveys described in this use case are national in scope, but with many having substantial detail. What kind of detail is most useful for local area applications and where can it be found?
7. What kinds of data are available for small areas – counties, cities, towns, and other entities where decision making occurs?
8. Administrative data from the IRS and from private sources (e.g., ADP 1099-MISCs) provide detailed data on sole proprietors/self-employed. What steps need to be taken to gain access to these data and how can current access by the Census Bureau be leveraged to obtain further access?
9. How do confidentiality requirements, especially those surrounding the Census Bureau's current Disclosure Avoidance System (DAS), affect the capacity of the CDE to gain access to data that can be shared with the data user community?
10. How can the CDE develop the interactive partnerships necessary to gain access to the data necessary for content curation, in a manner that brings value to **all** parties involved.

Appendix: Aligning Gig-related data by the US Census Bureau's four frames

Frame type, data sources, potential data sources to add	

Geographic Frame
Forms the backbone of the system of linked frames
• Evolution of the current Master Address File and Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) System.
 	
Other sources include:
• GMAF – Governments Masters Address File
• Geographic Partnership Programs (GPP) databasecontaining addresses and other contact information for tribal, state, and local governments
	Demographic (person) Frame
	• Complete demographic information for any individual who has ever responded to a Census Bureausurvey or enumeration since 2000
	  ○ ACS
	  ○ CPS Supplement – Contingent Worker Supplement (CWS)
	  ○ Federal Reserve Board - Survey of Household Economics and Decision- making
	  ○ Demographic Characteristics of Non-Employer Businesses (Census Bureau)
	  ○ Census Bureau Pulse Surveys: Small Business Pulse Survey: Tracking Changes During The Coronavirus Pandemic

Business Frame The Census Bureau Business Register is a relational database that links establishments with enterprises and stores attributes to facilitate access for sampling and publication purposes for economic programs. Survey of Non-Employer Businesses (Census Bureau) Small Business Credit Survey (Federal Reserve) IRS Schedule SE/C Tax Returns 1098-MISC IRS Returns Census Bureau Business Dynamics Statistics: Business Dynamics Statistics (BDS) (census.gov)	**Job Frame** Gallup *Education Consumer Pulse Survey* module ADP Research Payrolls Data Gig Worker On-Demand Economy survey (Prudential) Freelancers Union: Freelancing in America NORC General Social Survey RAND American Life Panel MBO Partners McKinsey Global Institute: Independent Work – Choice, Necessity, and the gig Economy JP Morgan Institute: The Online Platform Economy Worker Preference Surveys (e.g., US Remote Work Survey: PwC)

Note: Through the Census Bureau's Enterprise Frames Program, four key statistical frames are being linked to create a new universal statistical frame (Ratcliffe, 2021, U.S. Census Bureau, 2021, Keller et al., 2022). Their goal is to link together using geocodes and other keys from the Business Register of establishments, the Master Address File of housing units, the Longitudinal Employer-Household Dynamics (LEHD) jobs frame, and a demographic frame of individuals into a unified resource. This universal statistical frame will form the foundation, or scaffold, for organizing data and information within the Curated Data Enterprise (CDE).

References

Abraham, Katherine G, John C. Haltiwanger, Claire Hou, Kristin Sandusky, James R. Spletzer. 2021. "Reconciling Survey and Administrative Measures of Self-Employment." Journal of Labor Economics, volume 39, number 4, October.

Abraham, Katherine G, Brad Hershbein, and Susan Houseman. 2019. "Independent Contract, Informal, and Online Intermediary Work: Preliminary Evidence on Developing Better Measures in Household Surveys." LERA/ASSA Symposium, June. https://conference.iza.org/conference_files/Statistic_2019/abraham_k16798.pdf

Abraham, Katherine G and Ashley Amaya. 2018. "Probing for Informal Work Activity," Working Paper 24880, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138, August. http://www.nber.org/papers/w24880,

Abraham, Katharine G, John Haltiwanger, Kristin Sandusky, and James Spletzer. 2018. "Measuring the Gig Economy: Current Knowledge and Open Issues." Working Paper 24950, National Bureau of Economic Research, August. http://www.nber.org/papers/w24950 .

AP–NORC Center for Public Affairs Research. 2020. "Pandemic Disrupts Demand for Gig Economy Amidst Safety Concerns," Issue Brief, August.

Corcoran, Emily Wavering, Lucas Misera, and Marie Wiersch. 2021."Small Business Credit Survey, 2021 Report on Nonemployer Firms, Federal Reserve Bank of Cleveland.

De Stefano, Valerio. 2016. "The rise of the «just-in-time workforce»: On-demand work, crowdwork andlabour protection in the «gig-economy»." Conditions of Work and Employment Series No. 71, International Labour Organization.

Fairwork, Gig Work Principles. 2021. https://fair.work/en/fw/principles/fairwork-principles-gig-work/

Federal Reserve Bank. 2021. "Economic Well-Being of U.S. Households in 2020," May.

Fuller, J., Raman, M., Bailey A., Vaduganathan N., et al. 2020. *Building the on-demand workforce.* Published by Harvard Business School and BCG, November.

Gallup Inc, 2018. "Gallup's Perspective on The Gig Economy and Alternative Work Arrangements." https://acrip.co/contenidos-acrip/gallup/2020/mayo/gallup-perspective-gig-economy-perspective-paper.pdf .

Gamio, Lazaro. 2020. "The Workers Who Face the Greatest Coronavirus Risk," New York Times, March 15.

Holtz-Eakin, Douglas, Ben Gitis, and Will Rinehart. 2017. "The Gig Economy, Research and Policy Implications of Regional, Economic, and Demographic Trends." Aspen Institute Future of Work Initiative, American Action Forum, January.

International Labor Office. 2021 World Employment and Social Outlook: The role of digital labour platforms in transforming the world of work. ILO Flagship Report, Geneva.

Katz, Lawrence F. and Alan B. Krueger. 2019 "Understanding Trends in Alternative Work Arrangements in the United States." NBER Working Paper No. 25425, January 2019.

Keller, S., Prewitt, K., Thompson, J., Jost, S., Barrett, C., Nusser, S., Salvo, J., Shipp, S. (2022). A 21st Century Census Curated Data Enterprise. A Bold New Approach to Create Official

Statistics. Proceedings of the Biocomplexity Institute. Technical Report 2022-1115, https://doi.org/10.18130/r174-yk24

MBO Partners. 2021 "The Great Realization: New Data Looks at Bringing Independent Talent into Your Workforce Planning Next Year." December. https://www.mbopartners.com/state-of-independence/ McKinsey Global Institute. 2016. "Independent Work: Choice, Necessity, and the Gig Economy," October.

National Academies of Sciences, Engineering, and Medicine (2020). Measuring Alternative Work Arrangements for Research and Policy. Washington, DC: The National Academies Press. https://doi.org/10.17226/25822.Ratcliffe, M. (2021). Frames Program Update Census Scientific Advisory Committee Fall Virtual Meeting: September 23-24, 2021 https://www2.census.gov/about/partners/cac/sac/meetings/2021-09/presentation-frames-program-update.pdf

Sandusky, Kristin. 2018. "What May Be Driving Growth in the "Gig Economy? Detailed Look at Taxi, Limousine Services," U.S. Census Bureau, August. https://www.census.gov/library/stories/2018/08/gig-economy.html

Semuels, Alana. 2018. "The Internet is Enabling a New Kind of Poorly Paid Hell." *The Atlantic*, January 23.

Smith, R., S. Leberstein, S. 2015. Rights on Demand: Ensuring Workplace Standards and Worker Security in the On-Demand Economy, New York, National Employment Law Project.https://s27147.pcdn.co/wp-content/uploads/Rights-On-Demand-Report.pdf .

Upwork, Inc. 2020. "Freelance Forward 2020." Edelman Intelligence, September.

Ustek-Spilda, Funda, Mark Graham, Alessio Bertolini, Srujana Katta, Fabian Ferrari, and Kelle Howson. 2020. "From Social Distancing to Social Solidarity: Gig

Economy and the Covid-19". *OECD Development Matters* (blog), 27 March. https://oecd-development-matters.org/2020/03/27/from-social-distancing-to-social-solidarity-gig-economy-and-the-covid-19/

U.S. Bureau of Labor Statistics. 2018. "Contingent and Alternative Employment Arrangements —May 2017." Washington DC, June.

U.S. Census Bureau. 2020. "Census Bureau Releases New Demographic Data on Nonemployer Businesses," December 17, Release Number CB20-TPS.94.

U.S. Census Bureau. (2021). U.S. Census Bureau Budget, Fiscal Year 2022. U.S. Department of Commerce, Economics and Statistics Administration. https://www.commerce.gov/sites/default/files/2021-06/fy2022_census_congressional_budget_justification.pdf

Yildirmaz, Ahu, Mita Goldar, and Sara Klein. 2020. "Illuminating the Shadow Workforce: Insights into the Gig Workforce in Businesses." ADP Research Institute, February.5.