

# How Can We Quantify the Burgeoning Digital Economy?

## - The Limitations of GDP as a Measure and Efforts Towards the Development of New Statistical Measures-

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With the rapid spread of the digital economy, how can we gain a grasp of digital economic activity? The measurement of the digital economy is a topic of discussion both domestically and internationally. One particular focus is how to gain an overview of free digital services, which are difficult to measure in terms of the existing representative economic indicator GDP (the total value added of domestically-produced and provided goods and services).

This paper examines the value of free digital services in terms of consumers' potential willingness to pay. Based on the results of NIRA's Questionnaire Survey on the Effects of the Spread of COVID-19 on Telework-based Work Styles, Lifestyle, and Awareness, we estimated the size of the market if companies were to charge for digital services. Under the assumption of monopoly prices, a variety of digital services would earn 84-95 billion yen per year, and the total earnings of 10 types of digital services would be approximately 900 billion yen.

Without accurate statistics, the current status of a country cannot be determined; a decline in statistical accuracy will lead to the decline of a country. The creation of new statistical measures that measure the digital economy in a multifaceted manner while maintaining the use of existing measures is an urgent task. Data is scattered throughout society, necessitating a variety of trial-and-error efforts by the public and private sectors, including the use of private-sector data and the establishment of a data market to gain an overview of data trading activities\*.

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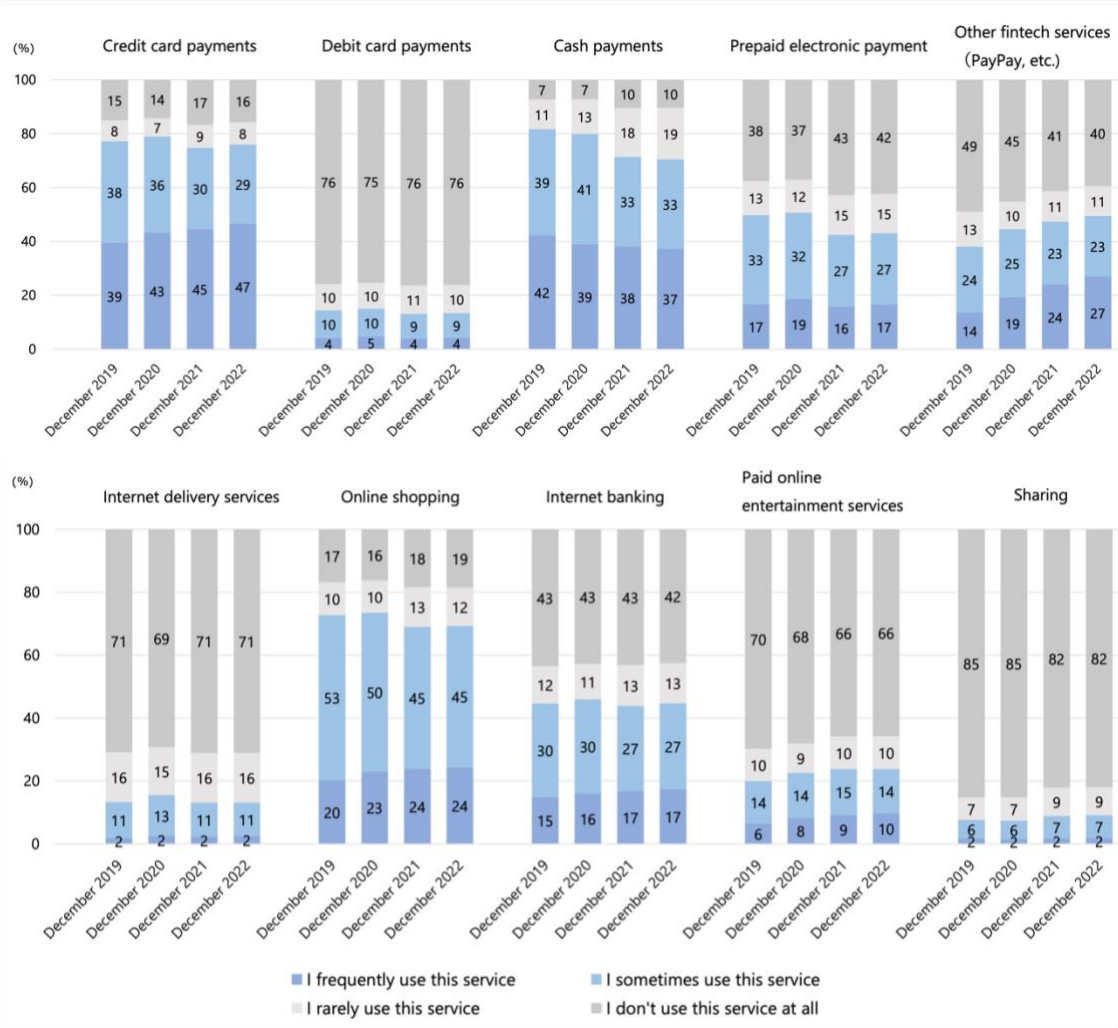
## **1. The Digital Economy Now Encompasses a Wide Range of Fields**

The digitalization of the economy has been steadily progressing, but the COVID-19 pandemic which began in 2020 accelerated the speed of this progress. In terms of work styles, telework has become widespread, and meetings using online conferencing tools such as Zoom have become routine. Companies are also shifting from paper media to a greater use of electronic data. Online registration and reservation applications for administrative procedures and a range of lifestyle services are increasing; Internet banking is increasingly offered by financial institutions, and automated cash registers and electronic payments at supermarkets and other stores are becoming the norm. Many people probably use a variety of services online, including the ordering of food deliveries, the making of reservations at restaurants and beauty salons, daily shopping, and reading books, listening to music, and watching videos.

Artificial intelligence (AI) is further accelerating this trend toward digitalization. Automated appliances are rapidly becoming more sophisticated, and fully automated driving is projected to be a reality in the near future. 2022 saw the arrival of ChatGPT, an AI-based chat service, which has become popular throughout the world.

The digitalization of the economy has spread out through all aspects of society, dramatically increasing the convenience of daily life. In order to grasp the actual status of the digital economy, the Toshihiro Okubo Laboratory and NIRA have jointly conducted nine rounds of the “Questionnaire Survey on the Effects of the Spread of COVID-19 on Telework-based Work Styles, Lifestyle, and Awareness” (Note 1). Figure 1 shows the results of this survey of the progress of digitalization in daily life in chronological order, showing the yearly change from December 2019, before the pandemic, to December 2022. While there are no sudden changes, it can be seen that the economy as a whole is steadily becoming more digitalized.

Figure 1: Spread of the digital economy



(Note: The December 2022 and December 2021 results are from the 8th round of the “Questionnaire Survey on the Effects of the Spread of COVID-19 on Telework-based Work Styles, Lifestyle, and Awareness” (conducted from December 2022 to January 2023, n=9,804); the December 2020 and December 2019 results are from the 3rd round of the Survey (conducted in December 2020, n=10,523).

Credit card payments were already used by more than 70% of respondents before the pandemic (this represents the sum of the responses "I frequently use this service" and "I sometimes use this service"; similarly below). On the other hand, just under 15% of respondents used debit cards, and this figure displayed no growth even during the pandemic. The largest growth rate was in the area of fintech (cashless payment services such as PayPay), which rose from 38% before the pandemic to 50% by the end of 2022. Thus, the use of digital payment grew, and the use of cash declined from 81% to 70%. This indicates a shift from cash payments to digital payments, in particular via fintech, due to the pandemic.

In the area of lifestyle services, shopping and delivery services using digital platforms seem to

be steadily penetrating the market, but the sharing economy (lodging, bicycles and cars, etc.) is still minuscule in the overall picture.

A closer examination of the survey results reveals that the percentage of respondents who answered that they use these services “frequently” has increased over time. As Figure 1 shows, the increasing trend towards frequent use is evident in credit card payments, fintech use, online shopping, internet banking, and the use of online entertainment services. When people begin to use digital services, they tend to use them frequently because of their convenience, ultimately becoming locked into contracts.

However, the diffusion of digital services is not uniform. While some people are actively using and benefiting from digital services, there are still many who are making almost no use of them. The “digital divide” seems to be becoming more pronounced, not only in the use of digital devices, but also in the use of services using those devices.

## **2. The Limitations of GDP as an Indicator and Alternative Statistical Indicators**

How to gain an overview of this diverse digital economy in economic statistics (the System of National Accounts, or SNA) has been a subject of debate both domestically and internationally.

As a measure of the total value-added of goods and services produced domestically, gross domestic product (GDP) is the most common indicator employed to tell us about a country's economy. It should be pointed out that there have been numerous criticisms of the supremacy of GDP as a measure to date. For example, it has been indicated that GDP does not represent the level of happiness and satisfaction among citizens, and that it does not reflect the effects of external diseconomies, especially environmental problems. In addition, there are many activities (e.g., household chores, trade in second-hand goods, etc.) that we cannot grasp the effect of via GDP. Although there are indicators that GDP does not capture, these do not carry a great deal of weight in terms of the overall economy, and economic policy has therefore traditionally been based on GDP and similar economic statistics.

Over the past 20 years, however, a movement to realize alternative indicators to GDP has gained ground internationally. For example, the report of the Commission on the Measurement of Economic Performance and Social Progress (the Stiglitz Commission), launched in 2008, explains the need to create a “dashboard” of multiple indicators in order to gain an overview of the social economy from multiple perspectives. In particular, the report proposed the importance

of measuring subjective well-being, the adoption of the “capability approach” (the concept of using human potential and possibilities as indicators to determine whether people are living lives that they value), and the creation of a fair distribution system. Subsequently, the United Nations’ “World Happiness Report” and the OECD’s “Better Life Index” were created. In Japan, statistics on happiness and life satisfaction have been produced by the Cabinet Office. For example, the “National Survey on Lifestyle Preferences” was conducted every three years from FY1978 to FY2008. In recent years, the “Survey on Satisfaction and Quality of Life” has been conducted, and there has been considerable discussion of dashboards focusing on satisfaction and quality of life.

Currently, discussions are underway regarding Japan’s SNA, looking towards a revision of the method employed in 2025. One aspect of these discussions is how to achieve a grasp of the progress of the digital economy. A particular focus here is how to gain an overview of the extent of free digital services. Because there is no market evaluation of the price of free services, they cannot be incorporated in market data; nevertheless, they are considered to be included in company costs, for example in advertising costs. This approach has the advantage of not requiring fundamental change to the SNA, but brings with it numerous inadequacies, such as the inability to isolate the digital economy. How to measure the digital economy, with its many free services, in the SNA is a major, and unavoidable, problem.

### **3. Existing Statistics Do Not Offer an Adequate Overview of the Reality of the Digital Economy**

Typical indicators related to digitalization include the IMD’s World Digital Competitiveness Ranking, which indexes factors including digital technology and the ICT environment, and the UN’s E-Government Survey. These are country-level indicators formulated and ranked based on a variety of data. They therefore do not directly measure the digital economy on a statistical basis.

In various countries throughout the world, there has been a movement toward the formulation of statistics that investigate the actual status of the digital economy itself. For example, in the United Kingdom, the 2016 “Independent Review of UK Economic Statistics” discusses how the digital economy can be understood statistically. In Japan also, the 2019 “White Paper on Information and Communication” discussed this point extensively. The scale of the digital economy has been growing at an unparalleled pace since the pandemic, which commenced in

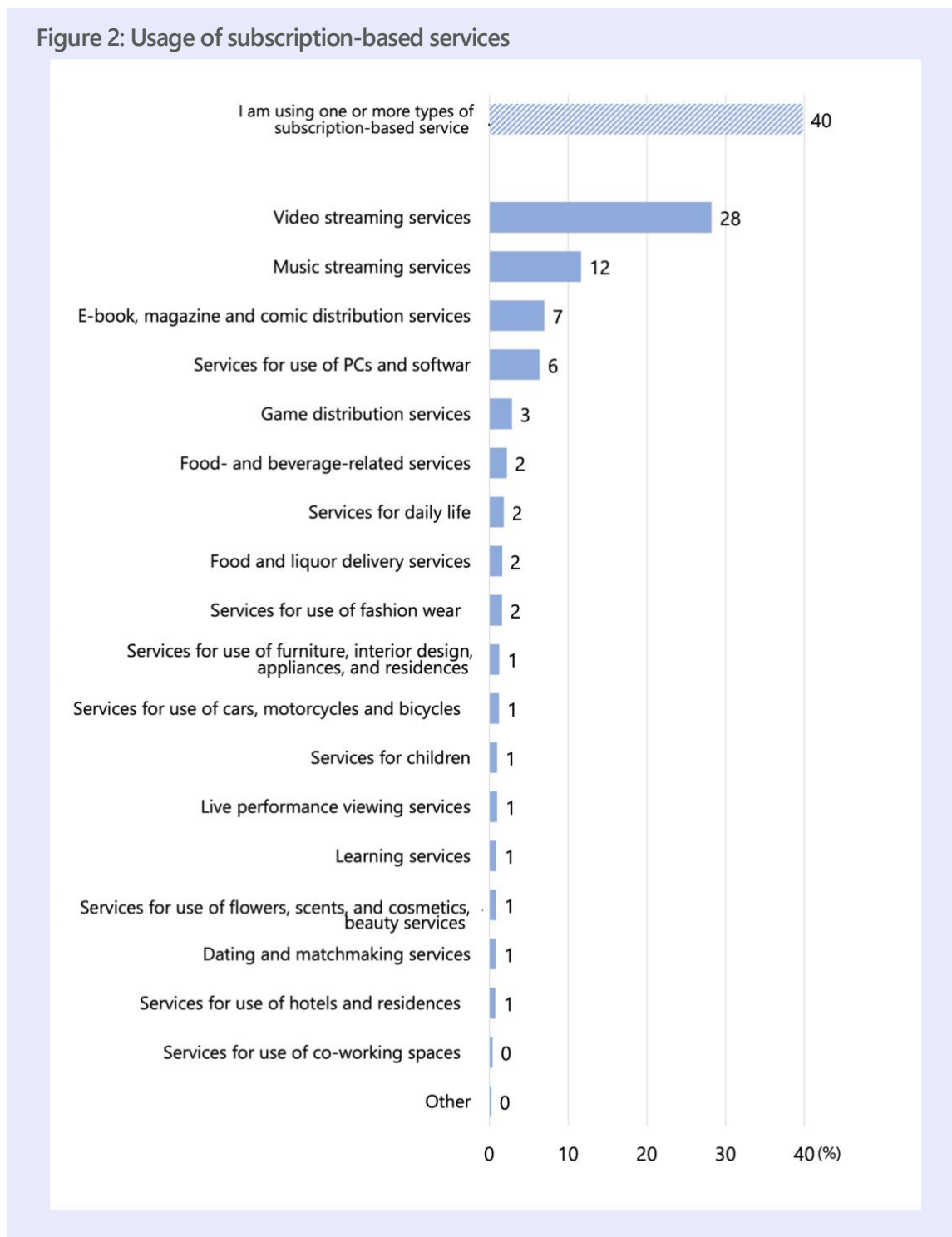
2020, making it an urgent issue to determine how to gain an overview of this economy in terms of GDP and existing economic statistics.

Why is it so difficult to grasp the reality of the digital economy? There are three main reasons: First, there are numerous free services. For example, Google, Twitter, and Facebook, all of which have a large number of users, are free. Prior to digitalization, content such as dictionaries, maps, timetables, and information magazines were sold as goods. All sales of content sold in bookstores were converted into GDP, but now all such content is available for free on the Web. The circulation of print media has declined over recent years; an increasing number of publications are going out of business, and the number of bookstores in Japan's towns and cities has plummeted. On the other hand, free digital content and tools have no price, no matter how much is consumed. Because they are counted as zero in statistics, GDP appears to be reduced, which does not reflect reality.

Second, exchanges on digital platforms are unclear. In recent years, there has been an increase in so-called "gig work," one-off work that is offered on digital platforms without employment contracts. An example of this is earning income from one-off household help in one's local neighborhood. Gig workers may also, for example, use their spare time to do data entry work, web development, delivery work, etc. This offers workers the opportunity to readily earn money, and consumers are also able to benefit from a variety of services that were previously unavailable at affordable prices. The gig economy is also difficult to grasp via current economic statistics. In certain countries (e.g., Switzerland and other small European countries), there is a movement toward the government gaining an overview of platform company activity. In Japan, however, it is difficult to grasp the actual situation because of the considerable scale of the market, the existence of a variety of platforms and businesses, and the broad scope of gig work.

Third, how do we evaluate the sharing economy? A typical example of the sharing economy is subscription-based services, which can be used for any amount of time at a low monthly price. Figure 2 shows the results of the 8th Questionnaire Survey on the Effects of the Spread of COVID-19 on Telework-based Work Styles, Lifestyle, and Awareness. About 40% of all respondents used some kind of subscription-based service, with music, videos, and e-books being the most common (28% for videos, 12% for music streaming, 7% for e-books). Today, video, music and game content is available for unlimited viewing and listening, and it is no longer necessary, for example, to purchase an entire series of manga.

Figure 2: Usage of subscription-based services



Subscription-based services are not limited to content distribution. Some services offer the use of watches, cars, furniture, children's toys, and more. For as little as ¥1,000 per month, a subscriber can have access to brand-name goods each month. In addition, while in the past toys, picture books, etc. were purchased one by one as children grew, subscription-based services allow them to be exchanged depending on a child's growth and changing preferences, and hence

there is no waste. Consumption behavior has changed dramatically: from buying and owning things to temporarily owning and sharing them.

Today, the market scale of subscription-based services has grown too large to ignore, but GDP as a measure does not provide a picture of the economic scale of these sharing economies. Taking music as an example, CDs are more rarely being purchased at CD stores, stores have disappeared, and audio equipment that plays CDs has become a rarity. Although economic statistics show that economic activity appears to be shrinking, in reality, not only is there no change from the situation as it was previously, the consumption of content itself is increasing dramatically.

#### **4. How Can We Gain an Overview of the Digital Economy?**

While we have indicated that there are three issues involved in measuring the digital economy, the discussion in this paper will focus on the first point, how to evaluate free services. This is because free services are expanding in all sectors and are considered to introduce significant statistical errors.

There are numerous arguments regarding how to interpret free services from the perspective of economics. It is possible to consider that digital data can be provided free of charge because the cost of reproduction is close to zero, while it may also be seen that the strategy of some businesses is to make the service temporarily free in order to capture users and charge for it later. A business model that uses networking effects to register free users and gain advertising revenue is also common, for example among social networking services. However, this paper will not attempt to interpret or theorize using an economics-based approach, but will rather explore the actual situation based on data and present guidelines for the future of economic statistics.

First, how should we think about goods and services with no price? One solution is to evaluate value by the degree of willingness to pay, by asking individuals to answer how much they would be willing to pay for a free tool if it were later charged for. Because the price of the tool or service is zero, the amount that people are willing to pay is entirely consumer surplus. This type of question was asked in the 9th Questionnaire Survey on the Effects of the Spread of COVID-19 on Telework-based Work Styles, Lifestyle, and Awareness. For each of the various free services considered, Figure 3 shows respondents' usage rates, and Figure 4 shows how much they would be willing to pay per month for each service if a fee was charged (the monthly fee was set for unlimited use, as in the case of subscription-based services. If the respondents did not originally



use the service, they were asked to select "Have not used the service," and this was not included in the tabulation in Figure 4).

Figure 3: Usage rates for digital services

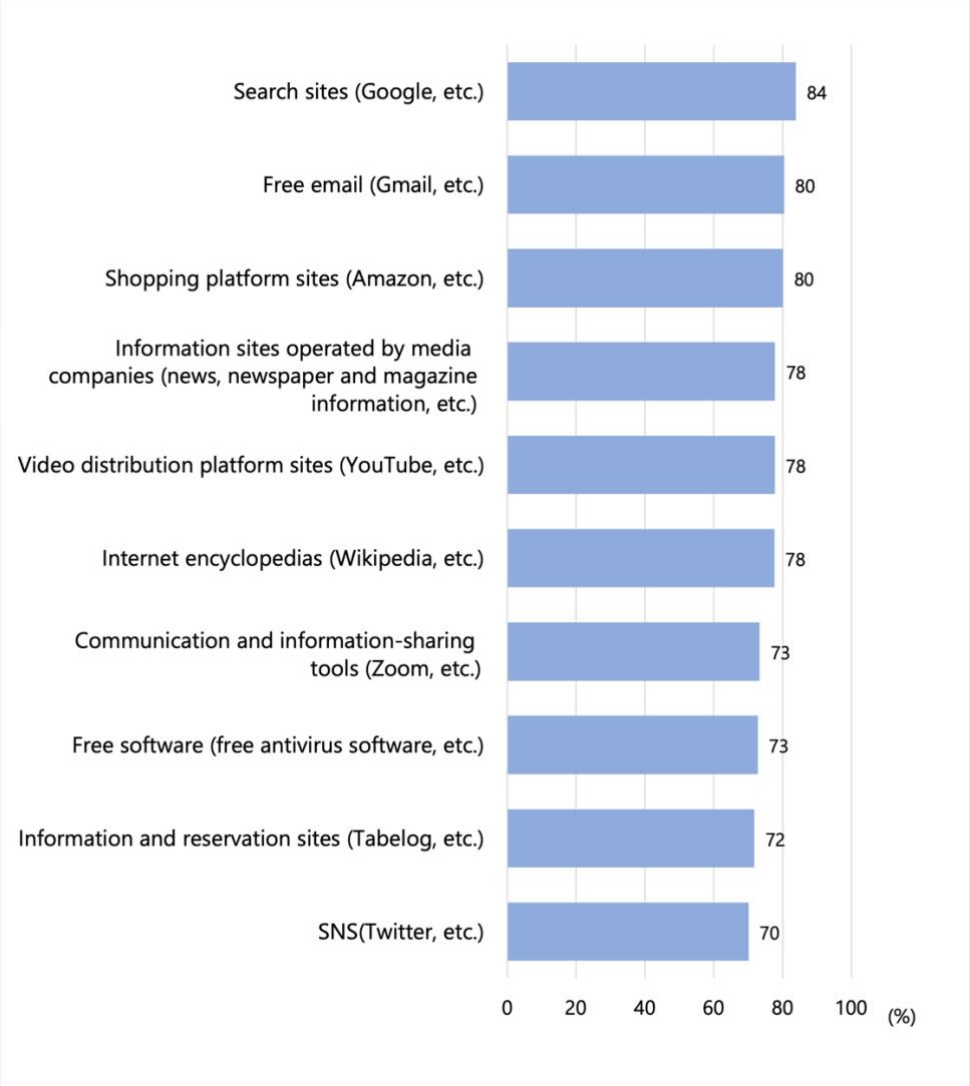
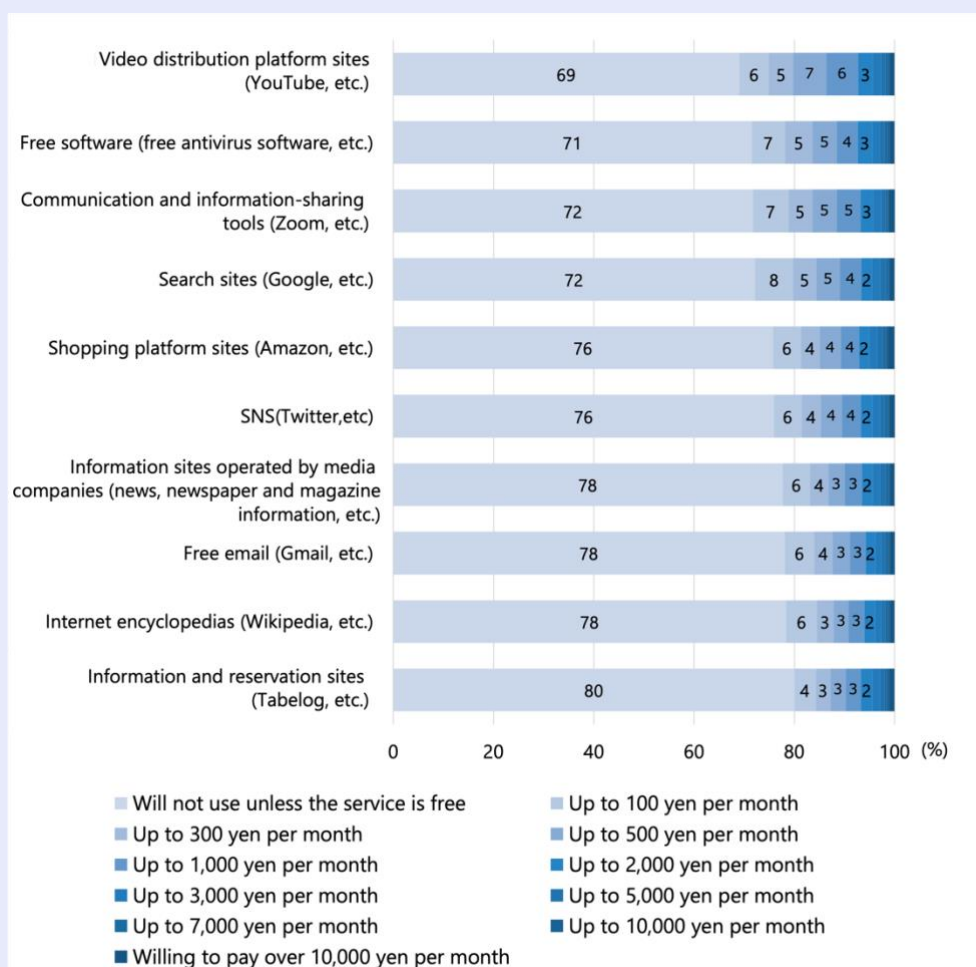


Figure 4: Amount respondents are willing to pay for digital services



First, the use of various services is generally high in all categories (Figure 3), with search sites such as Google and Yahoo at a very high 84%, followed by free email such as Gmail and Yahoo Mail (80%) and shopping platforms such as Amazon (80%). These services are used by more than 8 out of 10 users; SNS such as Facebook and Twitter showed the lowest percentage of responses at 70%, but still hold a high percentage, with 7 out of 10 respondents using them.

Figure 4 shows results when users were asked how much they would be willing to pay. Only between 20 and 30% of users would be willing to pay for the service if required to. The remaining 70-80% responded that they would not use the service if a fee was charged. In other words, their degree of willingness to pay is zero. This indicates that a very large number of people are hesitant to pay if they have become accustomed to free services that they are able to use as much as they want. Alternatively, perhaps it is difficult for them to imagine the inconvenience they would experience if they could no longer use something that had previously been free and unlimited.

There are also differences by category with regard to willingness to pay. The largest percentages of willingness to pay were in relation to video distribution platform sites such as YouTube, software, communication and information-sharing tools such as Zoom, and search sites such as Google, ranging from 28 to 31%. On the other hand, willingness to pay for SNS was 24%, and was lower for information and reservation-related sites, Internet encyclopedias, free e-mail, and news and information sites operated by media companies, at 20-22%.

Next, looking at willingness to pay itself, respondents' willingness to pay was generally concentrated around low amounts (100-1,000 yen/month or less); amounts above 1,000 yen were rarely selected, despite the fact that they were available as an option. The average amount respondents were willing to pay was generally around 300-400 yen when zero was included as a choice, and 1,400-1,900 yen when zero was not included. For example, the average amount respondents were willing to pay for search tools such as Google and Yahoo was 397 yen per month, including zero yen (respondents who would not use them unless they were free); when zero yen was not included, the average was 1,423 yen.

## **5. Estimation of the Market Scale of Free Digital Services: If Fees Were to Be Charged, Digital Services Would Cost 2,000 to 10,000 Yen per Month, and the Market Scale Would Be 84 to 95 Billion Yen**

Under the willingness-to-pay concept, only those who indicate a willingness to pay a higher price than the price the company has set will consume the service; those who indicate a willingness to pay only a price lower than that will not purchase the service. As the fee changes, the number of people who consume the service also changes. For example, when fees are reduced, the number of people who consume a service increases, but the company earns less revenue because the unit price is lower. On the other hand, when fees are increased, fewer people are willing to pay.

Let us consider a case in which companies have a monopoly on each digital service. In this case, each company is free to set the price at which it can maximize its revenue. For example, in the case of video distribution platform sites, the results of this survey show that 24.1% of workers would be willing to pay 100 yen or more per month. According to the Ministry of Internal Affairs and Communications' "Labor Force Survey (February 2023)," the number of workers in Japan is 66.67 million. Therefore, if video streaming platform sites were priced at 100 yen per month, the annual revenue would be 19.3 billion yen (1,200 yen per year x 66.67 million people x 24.1%). If the company holding the monopoly were to price the service at 2,000 yen per month, annual

revenue would be 90.2 billion yen (24,000 yen per year x 66.67 million people x 5.64%), given that 5.64% of respondents were willing to pay 2,000 yen per month or more.

Table 5 shows results for willingness to pay and an estimate of annual revenue (for 12 months) if a company holding a monopoly were to charge a specific price for digital services based on a figure of 66.67 million workers. The figures are shown in millions of yen. In this case the company holding the monopoly chooses the price so as to maximize its annual revenue. For example, for a video streaming platform site, the company would set the price at 2,000 yen per month because annual revenue is maximized at this figure. In the case of Zoom and Amazon, the price would be 10,000 yen per month for each service, and for search sites such as Google, the price would be 5,000 yen per month to realize the maximum revenue.

**Table 5 Estimates of Market Scale**

	(Million yen)									
	Amount each respondent is willing to pay (per month)									Perfect price discrimination
	100 yen	300 yen	500 yen	1,000 yen	2,000 yen	3,000 yen	5,000 yen	7,000 yen	10,000 yen	
Video distribution platform sites (YouTube, etc.)	19,281	46,778	62,963	84,884	90,245	81,124	83,204	80,644	83,204	271,542
Free software (free antivirus software, etc.)	16,609	38,186	47,842	67,443	85,444	78,004	87,604	84,004	83,204	247,652
Communication and information-sharing tools (Zoom, etc.)	16,585	37,250	48,162	67,763	79,524	75,364	78,004	74,484	84,004	237,132
Search sites (Google, etc.)	18,673	40,754	52,323	73,284	89,284	90,965	95,205	83,444	85,604	265,981
Shopping platform sites (Amazon, etc.)	15,585	35,930	48,002	68,643	90,405	97,205	112,006	106,965	114,406	280,350
SNS	13,513	31,250	41,442	59,203	76,004	75,124	81,604	79,524	77,604	222,211
Information sites operated by media companies (news, newspaper and magazine)	13,937	31,514	41,202	62,323	81,124	81,844	90,405	78,964	79,204	232,916
Free email (Gmail, etc.)	14,105	31,010	39,962	57,603	74,724	74,404	85,604	85,684	84,004	225,651
Internet encyclopedias (Wikipedia, etc.)	13,489	28,921	37,922	57,363	75,364	73,204	83,604	84,004	81,604	220,627
Information and reservation sites (Tabelog, etc.)	11,457	27,121	36,882	55,923	76,964	76,804	84,404	81,764	86,404	219,379
Total based on monopoly prices	899,565									
Total based on perfect price discrimination	2,423,441									

(Note) Figures in each cell show the value of annual sales of digital services at hypothetical prices based on willingness to pay. The value for respondents who selected "I don't use this service at all" and "Will not use unless the service is free" is assumed to be zero yen. Figures are calculated based on the results of the Ministry of Internal Affairs and Communications' "Labor Force Survey" for February 2023, and assume 66.67 million workers. Unit: million yen. Colored cells indicate maximum earnings in the case of monopoly prices.

Pricing by companies holding monopolies would set the price at around 5,000 yen per month for many services. Depending on the service, this could be 10,000 yen, which would seem rather high from the consumer's perspective. It is considerably higher than the abovementioned

average willingness to pay (excluding zero) of 1,400-1,900 yen per month. Monopolistic companies charge high prices that winnow out their consumer base, and only a select few with a high degree of willingness to pay will be able to consume their services. In today's digital economy, there are numerous monopolies and oligopolies held by platformers, and it is therefore quite possible that such monopoly prices could be reached if fees were to be charged.

At such monopoly prices, sales in each service category would represent a market of 84-95 billion yen per year. If we simplify our approach and assume that services can be replicated at zero marginal cost and without any other cost, all sales become profit and value-added (Note 2). Because this amount is directly included in GDP, the total for all 10 categories in the digital economy would increase GDP by about 900 billion yen per year if services were charged for (Note 3).

Let us now assume that instead of a uniform monopoly price, different prices can be charged to each individual using a service (i.e., "perfect price discrimination"). In this case, we assume that all users of the service up to the present have been able to purchase it at the price which they were willing to pay for it, and that the cost of providing the service was zero; the sum of all users' willingness to pay represents the company's profit. If this is the case, the sales for each service category would be 220-280 billion yen, or 2,423.4 billion yen per year for the 10 categories combined. Under conditions of monopoly pricing, only some willing payers could purchase, but under conditions of perfect price discrimination, all willing payers could purchase, and as a result more people would be able to purchase the service. Generally speaking, a certain degree of price discrimination is possible in the market, but perfect price discrimination is not easy to achieve. In the digital world, however, this will be a simple matter to achieve. For example, through the use of digital technology and big data, it would be possible to determine an individual's willingness to pay and to offer targeted services and prices accordingly.

What we have discussed above is an estimation based on specific assumptions. If we were to make different assumptions, the estimates would change. For example, even respondents who indicated that they would not use a service unless it was free would face various difficulties in their daily lives if the service was actually charged for, and it is therefore possible that many people would pay a fee if a fee was charged. Although the number of employed people was used in the estimation, the unemployed also use these digital services. The unemployed include pensioners, homemakers, and students; the preferences of all these groups differ significantly, and they also differ from those of the employed. As a result, their willingness to pay would also be likely to differ from that of the employed respondents discussed above. Although restrictions on the number of questions asked in the survey resulted in a focus on 10 categories, there are

other free services in addition to these 10. The market is further segmented within each item, because each category includes a number of different services, such as Facebook and Twitter. Given this, it is highly likely that the economic activity from free services will be much larger than the above estimates, by several to several tens of times. Nevertheless, although it is difficult to grasp the economic scale of free services using the existing concept of GDP, hypothetical calculations assuming a variety of conditions show that economic activity in this area is of a significant scale.

## **6. The Importance of Formulating Statistics That Are Suited to the Realities of the New Digital Economy and of Maintaining Existing Statistics**

Measuring the digital economy is not an easy task, and it requires an unconventional approach. At first glance, it may seem that it would be a simple task to measure this economy, because data is aggregated through digitalization. However, the digital economy spans a wide range of fields, and for this reason, its measurement presents difficulties.

To date, economic statistics have been based on the premise of “goods.” Manufacturers produce goods in factories and sell them at a price that includes added value. Consumers pay for goods at stores, and consume or own them. By contrast, in the digital economy, the focus is on “things,” for example digital data. Unlike goods, digital data is inexpensive to reproduce, can be produced in any quantity, and does not require inventory. From a consumption perspective, consumers are able to consume online as much as time permits.

It is no longer possible to measure a country's overall economic activity only by its GDP, the sum of the value-added of goods and services. Supplementary statistics focusing on the digital economy, encompassing free services, digital platforms, subscription-based services, the sharing economy, and the gig economy, will be essential. Moving forward, there will be various attempts to measure this economy in both the public and private sectors; the survey discussed in this paper represents one such attempt.

It is important to note, however, that statistics must remain consistent. It would not be a desirable approach to alter or eliminate survey items from existing business surveys and alter statistics such as GDP in order to gain an overview of the digital economy. “Evidence-based policymaking,” an approach in which policies are made based on the results of empirical studies (i.e., “evidence”) in economics and other fields, has recently been gaining momentum. What is needed for this is accurate data. Among these data, panel data are particularly useful. Panel

data is data that captures detailed changes in the behavior of individual people and companies over time. If statistical surveys or individual survey items are simplified or modified, it will become impossible to study data over a time series. This would impede empirical studies of policy effects and halt the progress of evidence-based policymaking. In order to measure the digital economy, we must adopt a new statistical approach, while maintaining existing approaches.

Recent news reports indicate that statistics tend to be somewhat ignored in Japan. Nevertheless, statistics represent the status of a country. Without accurate statistics, the current status of a country cannot be determined, and effective policies cannot be formulated. A decline in statistics will lead to a decline in a nation. Budgetary and staffing constraints should never be used to justify the simplification of existing statistics and the inclusion of digitalization-related survey data.

How, then, should new statistics concerning the digital economy be created? As has been discussed in this paper, the digital economy is so diverse that it is difficult to grasp its actual status simply by conducting surveys of consumers and businesses as has been done in the past. It will be necessary to go beyond preconceived notions and common sense and test new methods through trial and error. The survey method described in this paper, which focuses on willingness to pay, may be an effective method. The abovementioned Commission on the Measurement of Economic Performance and Social Progress (the Stiglitz Commission) has proposed the creation of a “dashboard,” a group of indicators of happiness and satisfaction with life. It seems that it will be essential to create data sets enabling us to understand the digital economy from multiple perspectives.

With the progress of digitalization, a variety of information can be obtained as electronic data. Digital platforms track user usage, and private companies, banks and insurance companies, and research firms also have access to a variety of data. Various think tanks also conduct innovative research that offer an overview of the digital economy that cannot be obtained through government statistics. One approach would be to create statistics that survey the digital economy using such private-sector data. Another effective measure would be to create a data market in which data that is presently scattered throughout society could be bought and sold.

## Note

\* In addition to the author, the survey and data analysis were conducted by Kiwamu Kato, Senior Architect, Future Corporation, and Atsushi Inoue, Kozue Sekijima, and Sosuke Suzuki of the Nippon Institute for Research Advancement (NIRA).

1 The survey has been conducted nine times to date, in April, June, and December 2020, April and September 2021, February, June, and December 2022, and March 2023, targeting more than 20,000 workers throughout Japan, and has looked at employment status, living conditions, and awareness from the perspective of workers in various industries, occupations, and regions. For details, please refer to the survey reports. The results of the 9th Survey can be found here: [Toshihiro Okubo and NIRA \(2023\), Report on the Results of the 9th Questionnaire Survey on the Effects of the Spread of COVID-19 on Telework-based Work Styles, Lifestyle, and Awareness](#)

2 Costs should actually be subtracted from market scale, but here costs are assumed to be zero, as they are assumed to be reflected in prices and inputs for other goods and services.

3 Here, we simply assume that domestic firms supply digital services.



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