



*An Economic Analysis of*  
***THE IMPACT OF  
DIGITAL MUSIC STREAMING***

**Robert Stoner** Managing Director  
**Jéssica Dutra** Director

Secretariat Economists  
Washington, D.C.

Prepared for  
Digital Media Association

April 2023

**DMA**  
**STREAMING  
FORWARD**

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## ABOUT THE AUTHORS

Robert Stoner is a Managing Director, Secretariat Economists, 135 Main Street, Suite 1850, San Francisco, CA 94105, [www.ei.com](http://www.ei.com). He received a Ph.D. in economics from the University of California, Berkeley, specializing in industrial organization. Dr. Stoner has written widely regarding intellectual property issues, including the importance of intellectual property in a standard setting context and methodologies for computing royalty rates and damages for patent-protected technologies. He has also written about potential reforms in the U.S. patent system. He has particular expertise in matters at the intersection of antitrust and intellectual property, given his previous position as an economist and manager at the Federal Trade Commission.

Jéssica Dutra is a Director, Secretariat Economists, 2121 K Street NW, Suite 1100, Washington, DC 20037, [www.ei.com](http://www.ei.com). She received a Ph.D. in economics from the University of Kansas, specializing in industrial organization and antitrust. She has experience estimating regional economic impact of local businesses, and for the U.S. copyright and music industries. Dr. Dutra has worked on unilateral conduct and merger cases in many countries, having a strong international background. She has published papers, taught classes, and delivered presentations on competition matters. She strives to bridge the gap between theory and practice.

## AUTHORS' ACKNOWLEDGEMENTS

Emily Buell, a Senior Associate at Secretariat Economists, performed some of the computer programming required to complete this study. We are also grateful for the guidance and support provided by Digital Media Association (DiMA). In particular, we would like to thank Garrett Levin, Lauren Danzy, and Sally Rose Larson of DiMA, and Frederick Hill of FTI for their insights and much-appreciated suggestions.

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Citation format: *An Economic Analysis of the Impact of Digital Music Streaming*, by Robert Stoner and Jéssica Dutra of Secretariat Economists, prepared for Digital Media Association (DiMA), April 2023, available at <http://dima.org>

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## FROM THE PRESIDENT AND CEO



Garrett Levin,  
DiMA President and CEO

Streaming has been the economic engine at the heart of the United States recorded music industry's resurgence over much of the past decade. In the U.S. alone, more than 100 million paying audio streaming subscribers generate revenue for labels and publishers, which has led to a new era of sustained prosperity for rightholders. Streaming has reoriented the earning potential of music, resulting in billions of dollars invested in the industry through public stock listings and acquisitions of valuable recording and publishing catalogs. And streaming's unlimited shelf space and unparalleled personalization have obliterated traditional industry barriers that limited both fan access to music and artist access to fans.

The above phenomena have been well documented and are central components of the success story of streaming and its role in today's dynamic, global music industry. To date, however, there has been far less examination of the broader impact of streaming on the U.S. economy, including job creation and innovation. Digital Media Association (DiMA) commissioned Secretariat Economists to undertake a study to fill that gap.

Their report sheds new light on music streaming's economic contributions in the U.S. The results speak for themselves—as streaming continues its impressive growth, the industry is providing profound benefits that ripple through the entire economy beyond those directly in the music industry.

Quite simply, streaming is a force multiplier for the broader economy. **For every \$1 in economic value generated by streaming, other sectors of the U.S. economy gain an additional \$1.65**—an amount more than three times the value generated by the music industry as a whole. That impact is undoubtedly driven in part by streaming services' investment in research and development (R&D), something they do at **more than twice the U.S. average R&D investment**.

The impact of streaming is also clearly seen in the labor market. **For every job directly in music streaming, the U.S. economy gains nine additional jobs** through indirect activity in other sectors and activity in U.S. communities where employees who work on streaming live. These jobs cross many different industries and professions not necessarily associated with music and **they are growing at an annual rate of 20%**.

Ultimately, music streaming in the U.S. **contributed \$14.32 billion to the U.S. gross domestic product (GDP) in 2021**. To add some perspective, that GDP impact is greater than the contributions of the water transportation (\$12.8 billion) and construction machinery manufacturing industries (\$11.5 billion)<sup>1</sup>, and similar to the entire 2021 GDP contributions of Santa Cruz County, California (population 270,861, \$15.0 billion GDP impact in 2021) and Alexandria, Virginia (population 159,467, \$13.1 billion GDP impact in 2021)<sup>2</sup>. Alongside the widely reported result that streaming generated \$12.4 billion in recorded music revenues in 2021, this \$14.32 billion contribution to U.S. GDP is proof positive of streaming's importance and broad benefits.

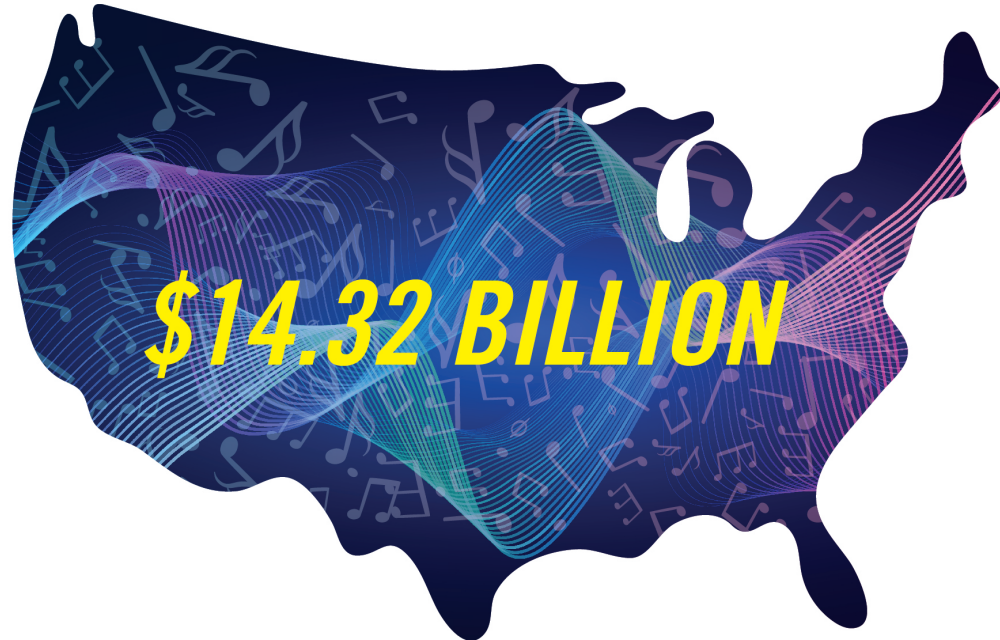
While the report does not consider U.S.-based impacts of music streaming that occurred outside the U.S. and makes conservative estimates based on data from years spanning the COVID-19 pandemic, it provides vital new data that has been missing from our broader conversations about today's streaming-centric music industry. As the music industry continues to evolve and streaming continues to innovate to better connect fans and artists, we hope this report fosters an enhanced understanding of music streaming's contributions to communities and industries beyond its more widely discussed topline revenue impact.

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<sup>1</sup> Bureau of Economic Analysis - Industry Data - GDP-by-industry

<sup>2</sup> Bureau of Economic Analysis - Gross Domestic Product by County, 2021

**STREAMING IN THE U.S. CONTRIBUTED \$14.32 BILLION TO THE U.S. GROSS DOMESTIC PRODUCT (GDP) IN 2021**



**OTHERS IN THE U.S. THAT MAKE A SIMILAR SIZED CONTRIBUTION TO STREAMING'S \$14.32 BILLION CONTRIBUTION TO THE U.S. ECONOMY**



**WATER  
TRANSPORTATION  
\$12.8 BILLION**



**CONSTRUCTION  
MACHINERY  
MANUFACTURING  
\$11.5 BILLION**

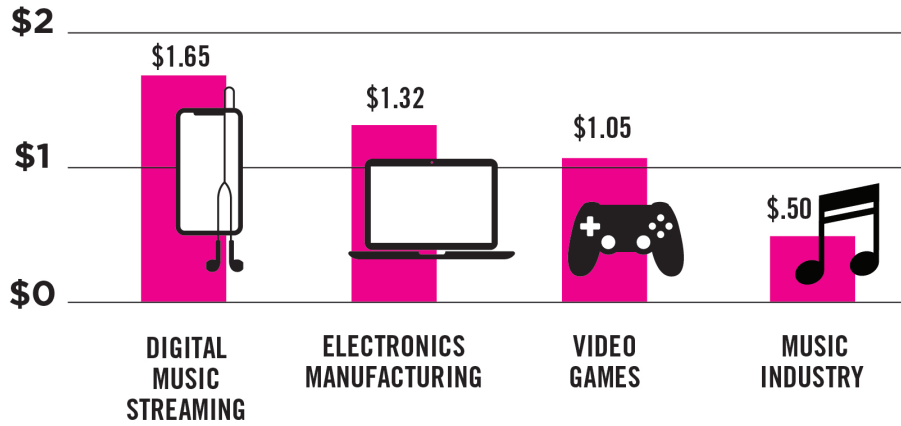


**SANTA CRUZ  
COUNTY, CA  
\$15.0 BILLION**

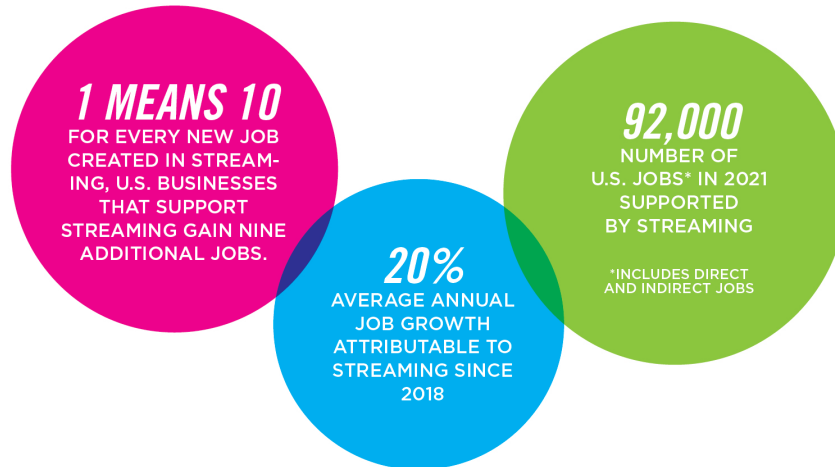


**CITY OF  
ALEXANDRIA, VA  
\$13.1 BILLION**

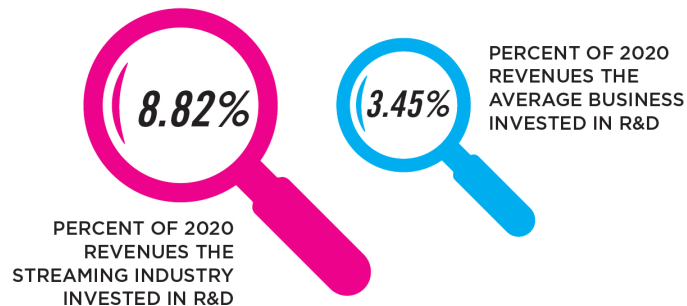
**THE U.S. MUSIC STREAMING INDUSTRY IS AN ECONOMIC FORCE MULTIPLIER, WITH ITS SUCCESS BENEFITING WORKERS AND BUSINESS IN OTHER INDUSTRIES. FOR EVERY \$1 STREAMING GENERATES, IT GENERATES \$1.65 FOR OTHER INDUSTRIES, FAR MORE THAN OTHER SECTORS OF THE ECONOMY.**



**STREAMING GROWS JOBS IN MANY DIFFERENT INDUSTRIES.**



**MUSIC STREAMING COMPANIES ARE RELENTLESS INNOVATORS—INVESTING MORE THAN TWICE AS MUCH IN R&D AS THE AVERAGE BUSINESS IN THE U.S. ECONOMY.**



## EXECUTIVE SUMMARY

Digital music streaming has contributed to a significant transformation in the way music is consumed. This report calculates and documents the ways in which this profound shift not only changed the manner in which music is ultimately consumed, but also impacted music streaming's overall contribution to the United States economy, particularly in the most recent years (2018-2021).<sup>3</sup>

The principal results of this study include:

**Growth** – Digital music streaming revenue has been growing significantly, with total output between 2018-2021 having grown at an average 18% annually.

**Economic multiplier** – For every \$1 generated in digital music streaming, an additional \$1.65 in value added is supported in adjacent sectors of the economy, effectively yielding a multiplier of 2.65. This 2.65 multiplier is particularly high when compared to other industries that have been recently studied: the 1.50 multiplier for the U.S. total music industry<sup>4</sup>, the 2.05 multiplier of the U.S. video game industry<sup>5</sup>, and the 2.32 multiplier in the U.S. electronics manufacturing sector<sup>6</sup>.

Adjacent sectors impacting the multiplier are varied, but include programming and software, marketing, consulting, and real estate, among others.

**U.S. GDP contributions** – In 2021, including direct and indirect/induced ripple effects in adjacent sectors (explained more fully within), digital music streaming contributed about \$14.32 billion to the U.S. gross domestic product (GDP).

**Jobs support** – Digital music streaming supported significant employment in several other sectors, such as computer programming services, printing, advertising, legal services, management consulting services, accounting, transit, etc., for a total supported employment of more than 92,000 jobs in the U.S. economy in 2021.

**Labor income** – Digital music streaming is a significant generator of labor income, providing approximately \$2.6 billion in direct income (i.e., wage and salary, benefits, payroll and personal taxes, and proprietor income) and a total of nearly \$8.4 billion to the overall economy including ripple effects in 2021.

**Research and Development (R&D)** – Digital streaming platforms invest heavily in R&D, spending 8.82% of revenue in 2020. This was more than twice the rate of the average industry in the U.S. (3.45%).

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<sup>3</sup> All values presented here are inflation-adjusted and expressed in 2022 dollars. Hence, any growth is real growth.

<sup>4</sup> See *The U.S. Music Industries: Jobs & Benefits*, by Robert Stoner and Jéssica Dutra of Economists Incorporated, prepared for Recording Industry Association of America (RIAA), December 2020, available at [www.riaa.com](http://www.riaa.com).

<sup>5</sup> See *Video Games in the 21st Century: The 2020 Economic Impact Report*, by TEconomy Partners, LLC, prepared for The Entertainment Software Association, available at [www.theesa.com](http://www.theesa.com).

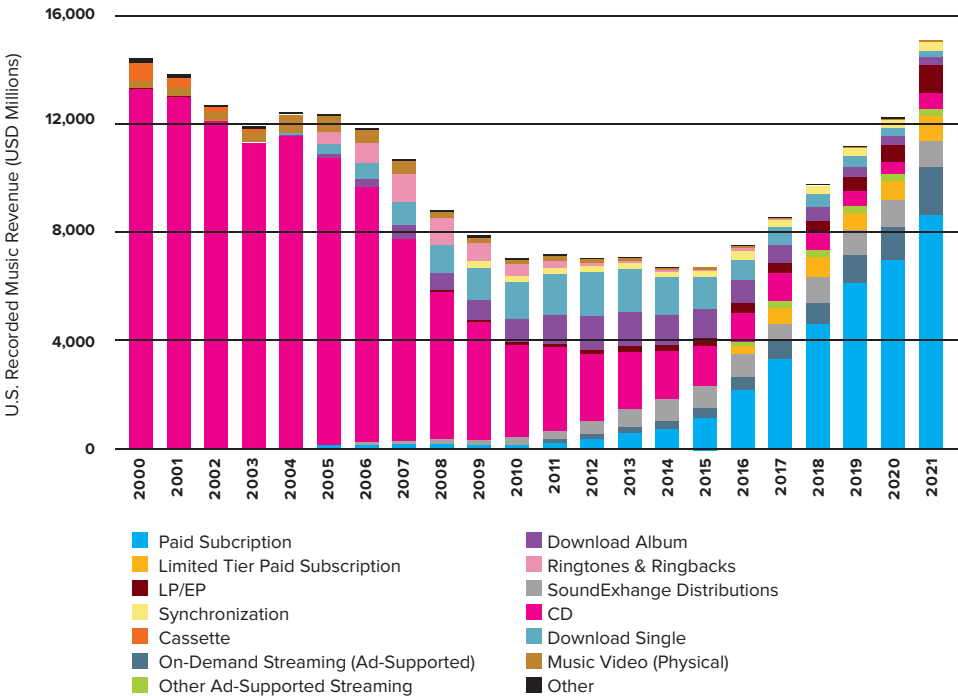
<sup>6</sup> See *The Economic Impacts of the U.S. Electronics Manufacturing Sector, 2020*, available at [www.ipc.org](http://www.ipc.org).

## DIGITAL MUSIC STREAMING HAS BEEN A MAJOR MEANS OF CONSUMPTION

Digital music streaming has become a major means of music consumption as measured by recorded music<sup>7</sup> revenue, as shown in Figure 1 and Figure 2. In 2015, according to the Recording Industry Association of America (RIAA) sales database, streaming generated \$2.331 billion in recorded music<sup>7</sup> revenue, or 34.7% of the total revenues.<sup>8</sup> Globally, those figures were \$2.8 billion and 19%. Since then, streaming has grown significantly both in terms of music consumption and contribution to revenue generation across the industry. The RIAA's 2021 Year-End report shows that in the U.S., streaming now accounts for 83% of recorded music revenues, totaling \$12.4 billion.<sup>9</sup> The International Federation of the Phonographic Industry's (IFPI's) most recent reporting shows similar growth globally, with streaming now accounting for 65% of total global recorded music revenues, or \$16.9 billion.<sup>10</sup>

**FIGURE 1: U.S. RECORDED MUSIC REVENUE BY FORMAT AND YEAR, 2000-2021**

Source: RIAA U.S. Recorded Music Revenue by Format



According to IFPI's 2022 *Engaging with Music* report, 74% of people listen to music through licensed audio streaming services, either through a paid subscription or as an ad-supported profile. The same report shows listeners' preferences towards streaming related to the "uninterrupted and on-demand access to the millions of licensed tracks available." Subscription audio listening was more prevalent among the younger demographics, with 56% of 25-34 year-olds subscribing to an audio streaming service.

<sup>7</sup> Recorded music means published sound recordings embodying musical works and performing artists' performances of such works.

<sup>8</sup> RIAA U.S. Sales Database

<sup>9</sup> RIAA Year-End 2021 RIAA Revenue Statistics

<sup>10</sup> IFPI Global Music Report 2022



**FIGURE 2: U.S. DIGITAL STREAMING RECORDED MUSIC REVENUE BY YEAR, 2005-2021**

Source: RIAA U.S. Recorded Music Revenue by Format

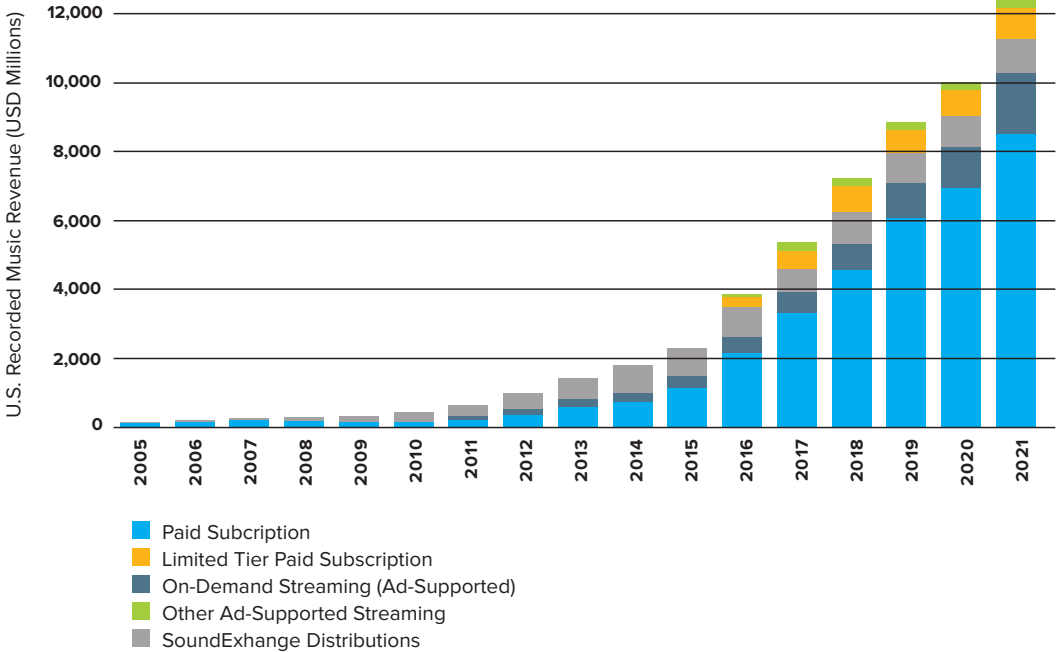
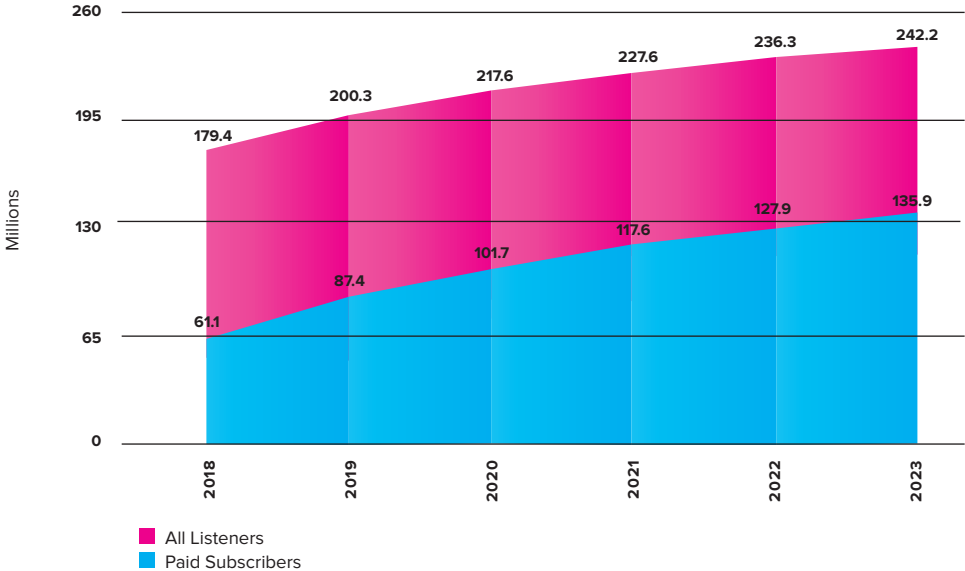


Figure 3 shows digital audio listeners and *paid* subscribers for the major streaming platforms<sup>11</sup> since 2018, while also projecting to 2023. Based on these data, it is possible to see that *i*) the number of digital subscribers has been growing and will continue to grow, at least in the near term; and *ii*) the number of paid digital subscribers will continue to represent a larger share of the market compared to ad-supported listeners.

**FIGURE 3: U.S. DIGITAL AUDIO LISTENERS AND PAID SUBSCRIBERS, 2018-2023**

Note: "All Listeners" includes internet users of any age who listen to a major digital audio service on any device at least once per month. "Paid Subscribers" includes internet users of any age who subscribe to a major paid digital audio service. Each individual account on qualifying family plans counts as a unique paid subscriber. "Paid Subscribers" includes paid promotional subscribers and free trial users.

Source: eMarketer, Aug 2020 and eMarketer, Aug 2021.



<sup>11</sup> Amazon Music, Apple Music, Pandora, Spotify, YouTube Premium.

## DETERMINING ECONOMIC IMPACT

To help determine the economic impact of digital music streaming in the U.S. economy, we have utilized IMPLAN, an input-output model with built-in economic impact data which depicts the overall interdependence of industries and permits calculation of the contribution of a particular economic activity as it propagates in the economy. IMPLAN is a common tool utilized by economists that relies on calibrated algorithms and study-specific data inputs to measure impact across the economy. It is widely used in academia, government, and in private industry to measure the impact of a diverse variety of sectors and specific projects. IMPLAN has been on the market for more than forty years and has several benefits for the study of economic impact analysis such as the one developed in this report. IMPLAN, in its current formulation, divides the U.S. economy into 546 industries and allows for rich tracking of impacts into adjacent sectors.<sup>12</sup> The more finely defined an industry is, the more detail one can obtain about spending patterns and economic activity. IMPLAN also collects and allocates data from a wide range of government data sources, such as the Census of Employment and Wages from the Bureau of Labor Statistics (BLS), Bureau of Economic Analysis (BEA) state-level GDP data, National Income and Product Accounts (NIPA), and Regional Economic Accounts, as well as output from the Energy Information Administration (EIA), among others.<sup>13</sup> The richness of underlying data provides a reliable estimation of the relationship across industries and the overall economic activity in the different sectors, as well as the spending patterns for any given year.

Music streaming doesn't neatly fall within one of these IMPLAN-defined industries. However, the activity in question most closely relates to the IMPLAN-defined industry "Internet publishing and broadcasting and web search portals."<sup>14</sup> The specific impact of digital music streaming is estimated based on the yearly revenue it generates, which by definition is equivalent to the direct output of digital music streaming; the multipliers that measure how this economic activity propagates in the economy are based out of the larger IMPLAN-defined industry. To the extent that digital music streaming platforms are similar<sup>15</sup> to the other economic activity defined in the same IMPLAN-defined industry, for any given year, the results will be consistent in magnitude. It is possible then to estimate not only the direct economic impact of the digital music streaming business, but also the impact in adjacent sectors, such as suppliers (e.g., Real Estate, Software Publishers, Computer System Design Services, Advertising, Printing, Insurance, etc.), and where digital music streaming employees spend their salaries (e.g., Housing, Hospitals, Physicians, Restaurants, Retail, Insurance, etc.). These adjacent sectors, as well as their relative importance vis-à-vis digital music streaming, is determined by the underlying algorithm calibrated annually in IMPLAN that tracks the economy's spending patterns and the relation between different industries.

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<sup>12</sup> The IMPLAN industry scheme is based on North American Classification System (NAICS) codes in different levels of aggregation.

<sup>13</sup> For more detail on IMPLAN data sources, access [IMPLAN - Support - IMPLAN Data Sources](#).

<sup>14</sup> Spotify's NAICS code is "519130: Internet publishing and broadcasting and web search portals" ([Spotify Technology SA \(SPOT\) Stock Price, Trades & News](#)), which falls under the IMPLAN industry classification "438: Internet publishing and broadcasting and web search portals" [IMPLAN - Support - IMPLAN Industries & NAICS Correspondences](#).

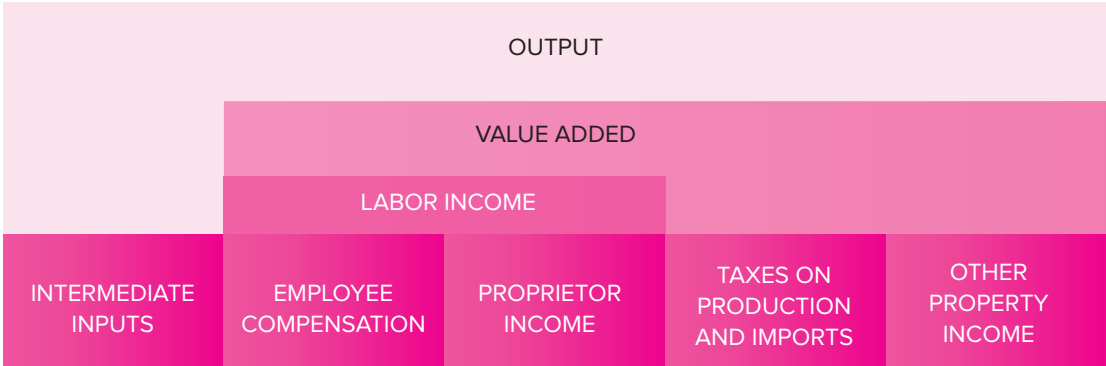
<sup>15</sup> *Similar* in labor intensity, average compensation, spending patterns, supply chain, etc.

The size of the digital music streaming market, as measured by revenue that is used as an input to the model, is shown in Figure 2 above. This music streaming revenue measure has been obtained from RIAA, which to the best of our knowledge is the publicly available data most appropriate to conducting this study.<sup>16,17</sup>

We show economic impact in several measures: *Output*, *Employment*, *Labor Income*, and *Value Added* (which is equivalent to GDP contribution). Figure 4 shows how all these values inter-relate within the IMPLAN model, giving a more complete picture of the role that digital music streaming plays in the economy. Subsequently, we explain in more detail what each of these measures portrays.

**FIGURE 4: DISTINCT COMPONENTS OF AN INPUT-OUTPUT MODEL**

Source: IMPLAN - Support - Understanding Value Added (VA)



a. *Labor Income* includes both employee compensation (salary, wages and benefits) and proprietor income (the compensation and benefits a proprietor receives in exchange for the work put into the business). Labor income can be directly tied to digital music streaming (*i.e.*, Direct Labor Income), which involves people working in the digital music streaming industry and includes personal and payroll taxes. Labor income can also include, through ripple effects, the broader income measures from input suppliers indirectly dependent on streaming (thus employee compensation and proprietor income from adjacent industries). This latter indirect labor income measure follows the same principles as when measuring Direct Labor Income. Again, for a more complete explanation of ripple effects, see below.

i. Similarly, *Employment* is a measure of the number of jobs tied to digital music streaming or adjacent sectors, depending on whether we are talking about direct or ripple effects.

b. *Value Added* can be thought of as contribution to GDP, as it refers to the difference between input costs and value of the output supported by digital music streaming.

<sup>16</sup> Recording Industry Association of America (RIAA) provides comprehensive data on U.S. recorded music revenues, broken down by format, which allows for reliable estimation of the magnitude of the domestic industry.

<sup>17</sup> While the U.S. Census Bureau provides receipts per narrowly defined industry (*i.e.*, 6-digits NAICS) via the Statistics of U.S. Businesses (SUSB), there are two big downsides to using these data: *i*) Receipts are only collected every 5 years, in years ending in 7 and 2, and hence the updates are infrequent; *ii*) there is no NAICS that uniquely defines digital music streaming, hence other assumptions would have to be made to determine the value correspondent to the size of industry we intend to quantify. Accordingly, we use the RIAA digital music streaming revenue data as our starting point.

c. *Total Value of Output* puts a dollar value on all services provided by digital music streaming companies directly as well as products and services of its suppliers and other firms that sell inputs to those suppliers.

The impacts listed above can thus initially be broken down into two dimensions: direct effects and ripple effects. Ripple effects, in turn, can be broken down into indirect and induced effects. These impacts and how they are related can be summarized as follows:

i. *Direct Effects* are associated with the initial production of the industry being analyzed.

ii. *Ripple Effects* account for all production along the supply chain, and the additional production triggered by spending on payroll and purchases of these suppliers.

i. Indirect Effects account for the fact that each supplier of goods and services to a particular industry like digital music streaming purchases its inputs from other suppliers.

ii. Induced Effects account for employees within the directly and indirectly affected industries spending their increased income widely and thus triggering additional production.

As indicated above, all monetary values in this report are shown in 2022 dollars (*i.e.*, adjusted for inflation); hence any growth can be readily interpreted as real growth. Additionally, IMPLAN's latest modelling of the economy is for 2020, and therefore we projected all 2021 economic activity using the same underlying model as 2020, only with prices adjusted to 2021. This is a very conservative assumption as the economic environment significantly improved between 2020 and 2021. Given that the pandemic setting extended somewhat into 2021, this 2020 model can reasonably be used, with the caveat that our 2021 estimates would be conservative valuations of the true overall impact (including direct and ripple effects) of digital music streaming, and the true values are likely higher in magnitude.

## DIGITAL STREAMING ECONOMIC IMPACT

As shown above in Figure 1, we have gathered U.S. recorded music revenues by format from RIAA. For music streaming, we focus specifically on *Paid Subscription*, *On-Demand Streaming (Ad-Supported)*, *Limited Tier Paid Subscription*, *SoundExchange Distributions*, and *Other Ad-Supported Streaming* as shown in Figure 2 above, as these categories tend to reflect the digital music distributed through most on-demand streaming platforms. These categories serve as an input for the IMPLAN model. In fact, revenue for a particular industry can be thought of as the direct output of the industry, as shown below.

### Output

One of the measures of economic impact is output, which shows the monetary value of the sum of inputs used in the production and supply of music streaming services output. This includes, but isn't limited to, royalties, technology for broadcasting, marketing, and R&D. Table 1 shows that music streaming services directly supported \$12.6 billion in economic activity in 2021<sup>18</sup>, while experiencing an impressive 18% average annual growth rate from 2018-2021. Moreover, an additional \$15.3 billion of economic activity in adjacent sectors has been supported by music streaming economic services, for a total of \$27.9 billion either directly or indirectly connected to music streaming. We have listed examples of adjacent sectors in previous sections of the report.

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<sup>18</sup> This is the same data contained in Figure 2.

**TABLE 1: U.S. DIGITAL MUSIC STREAMING SUPPORTED OUTPUT**

Note: \*2021 was estimated with 2021 RIAA revenue data projected on the 2020 economy.  
Source: RIAA U.S. Recorded Music Revenue by Format and IMPLAN Multipliers.

	USD MILLIONS				AVERAGE ANNUAL GROWTH
	2018	2019	2020	2021*	
<b>Direct</b>	<b>7,668</b>	<b>9,246</b>	<b>10,308</b>	<b>12,601</b>	<b>18%</b>
<b>Indirect+induced</b>	<b>8,914</b>	<b>12,506</b>	<b>12,564</b>	<b>15,359</b>	<b>20%</b>
<b>Total</b>	<b>16,583</b>	<b>21,753</b>	<b>22,873</b>	<b>27,961</b>	<b>19%</b>

In Table 2, we list adjacent industries that had the ten largest indirect and induced effects, as well as the associated dollar magnitude as measured by output as a result of digital music streaming.

**TABLE 2: TOP 10 INDIRECT AND INDUCED AFFECTED INDUSTRIES BY DIGITAL MUSIC STREAMING BY OUTPUT, 2021**

Note: 2021 was estimated with 2021 RIAA revenue data projected on the 2020 economy.  
Source: RIAA U.S. Recorded Music Revenue by Format and IMPLAN Multipliers.

INDIRECT		INDUCED	
INDUSTRY	OUTPUT (\$M)	INDUSTRY	OUTPUT (\$M)
Other real estate	518	Owner-occupied dwellings	640
Employment services	486	Hospitals	360
Custom computer programming services	437	Other real estate	292
Advertising, public relations	361	Insurance carriers	238
Printing	359	Monetary authorities	217
Radio and television broadcasting	294	Offices of physicians	190
Cable and other subscription programming	225	Tenant-occupied housing	159
Management consulting services	222	Limited-service restaurants	152
Legal services	202	Other financial investment	147
Wired telecommunications carriers	199	Management of companies	134

## Employment

Another important measure of economic impact involves labor. While digital music streaming isn't a particularly labor-intensive industry, it can be seen as an industry with high relative productivity per worker when compared to other industries, with an output per worker of \$1.3M.<sup>19</sup> Table 3 shows the average output per worker for a few U.S. industries in 2020.

**TABLE 3: AVERAGE OUTPUT PER WORKER IN DISTINCT INDUSTRIES**

Note: \*Digital music streaming averages are taken from IMPLAN defined industry, Internet publishing and broadcasting and web search portals.

Source: IMPLAN® model, 2020 Data, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (data and software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078 [www.IMPLAN.com](http://www.IMPLAN.com).

INDUSTRY	OUTPUT PER WORKER (\$ THOUSANDS)
Digital music streaming*	1,323
Electric power generation – fossil fuel	1,456
Electronic computer manufacturing	1,124
Audio and video equipment manufacturing	657
Oil and gas extraction	534
Scientific research and development services	247

Moreover, there are still significant job effects supported by the substantial economic activity that music streaming supports, particularly when accounting for indirect and induced effects. Those job effects are expressed through Employment in Table 4 directly below, and Labor Income in Table 6 later in the report.

**TABLE 4: U.S. EMPLOYMENT SUPPORTED BY DIGITAL MUSIC STREAMING**

Note: \*2021 was estimated with 2021 RIAA revenue data projected on the 2020 economy.

Source: RIAA U.S. Recorded Music Revenue by Format and IMPLAN Multipliers.

	2018	2019	2020	2021*	AVERAGE ANNUAL GROWTH
Direct	6,070	7,035	7,599	9,289	15%
Indirect + Induced	47,604	66,910	68,346	83,550	21%
Total	53,674	73,945	75,945	92,839	20%

In year 2021, there were 9,289 direct jobs supported by music streaming. The number of direct jobs expressed here is supported by the economic activity generated by digital music streaming described in Figure 2 of this report. As such, it is limited to the jobs directly generated by streaming revenue in the U.S. (i.e., the U.S. jobs that are supported in digital music streaming platforms by streaming revenues generated in different countries aren't accounted for). Similarly, jobs supported by other economic activities performed by these digital streaming platforms aren't accounted for (e.g., podcast and audiobook streaming, financial income, etc.). The number of direct jobs is also likely higher in its own right, given the conservative nature of the 2021 estimates mentioned above.

<sup>19</sup> IMPLAN® model, 2020 Data, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (data and software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078 [www.IMPLAN.com](http://www.IMPLAN.com).

Digital music streaming has also supported significant employment in several other sectors, such as computer programming services, printing, advertising, legal services, management consulting services, accounting, transit, etc., for a total supported employment of more than 92,000 jobs in the U.S. economy in 2021.<sup>20</sup> IMPLAN’s employment impact analysis takes into consideration not just wage and salaried employment, but also proprietors and self-employment.

For the occupations that receive either a wage or a salary, IMPLAN gives details on the types of occupations, which are shown in Table 5 below, that span a wide range of specialties.<sup>21</sup> These occupations reflect employment that is supported by digital music streaming through both direct and ripple effects.

**TABLE 5: OCCUPATION IMPACT DETAIL, 2021 \***

Note: \*Occupation is projected for year 2021 based on information available up to 2019.  
Source: RIAA U.S. Recorded Music Revenue by Format and IMPLAN Occupation Impact Estimates.

OCCUPATION	WAGE AND SALARY EMPLOYMENT
Management Occupations	4,611
Business and Financial Operations Occupations	5,055
Computer and Mathematical Occupations	5,602
Architecture and Engineering Occupations	639
Life, Physical, and Social Science Occupations	326
Community and Social Service Occupations	661
Legal Occupations	687
Educational Instruction and Library Occupations	1,431
Arts, Design, Entertainment, Sports, and Media Occupations	2,439
Healthcare Practitioners and Technical Occupations	2,693
Healthcare Support Occupations	2,237
Protective Service Occupations	919
Food Preparation and Serving Related Occupations	4,936
Building and Grounds Cleaning and Maintenance Occupations	2,210
Personal Care and Service Occupations	1,141
Sales and Related Occupations	6,971
Office and Administrative Support Occupations	10,808
Farming, Fishing, and Forestry Occupations	339
Construction and Extraction Occupations	635
Installation, Maintenance, and Repair Occupations	2,444
Production Occupations	3,973
Transportation and Material Moving Occupations	6,859

<sup>20</sup> These employment numbers cannot be assumed to be full-time jobs, as IMPLAN calculates a job as simply a position within a business. For wage and salary employment, a worker is counted as some proportion based on the time period within the year that the worker was employed.

<sup>21</sup> The gap between the number of total supported employment and the sum of wage and salary occupation details described in Table 5 come from the number of proprietor and self-employed positions supported by digital music streaming activities.

We also compute the economic impact of digital music streaming as a generator of labor income in the U.S. economy. Labor Income, as shown in Figure 4 above, involves both Proprietor Income and Employee Compensation. Proprietor Income represents the value of payments received by any self-employed individuals and/or unincorporated business owners, while Employee Compensation represents the fully-loaded value of all payroll paid to any employees. As such, Labor Income represents the collective value of both Proprietor Income and Employee Compensation.

**TABLE 6: U.S. LABOR INCOME SUPPORTED BY DIGITAL MUSIC STREAMING**

Note: \*2021 was estimated with 2021 RIAA revenue data projected on the 2020 economy.  
Source: RIAA U.S. Recorded Music Revenue by Format and IMPLAN Multipliers.

	USD MILLIONS				AVERAGE ANNUAL GROWTH
	2018	2019	2020	2021*	
Direct	1,602	1,779	2,165	2,647	18%
Indirect + Induced	3,124	4,377	4,692	5,735	22%
Total	4,726	6,156	6,857	8,383	21%

Digital music streaming has generated significant labor income, having accounted for \$2.6 billion in direct labor income to employees in 2021, and a total of \$8 billion in the same year when accounting for the income in adjacent sectors. For a complete explanation of what constitutes labor income, please refer to previous sections.

### Value Added

Value Added can be thought of as contribution to GDP, as it takes output and deducts the value of any intermediate inputs. Given the rapid growth we have documented in output (revenue) of digital music streaming in Figure 2 above, we observe a similar trend in value added, with an 11% average annual growth rate of value added directly by digital music streaming from 2018-2021, yielding a direct effect of \$5.4 billion in 2021 to the U.S. economy, as shown in Table 7.

**TABLE 7: U.S. IMPACT VALUE ADDED SUPPORTED BY DIGITAL MUSIC STREAMING**

Note: \*2021 was estimated with 2021 RIAA revenue data projected on the 2020 economy.  
Source: RIAA U.S. Recorded Music Revenue by Format and IMPLAN Multipliers.

	USD MILLIONS				AVERAGE ANNUAL GROWTH
	2018	2019	2020	2021*	
Direct	3,983	3,617	4,421	5,405	11%
Indirect + Induced	5,041	7,089	7,290	8,911	21%
Total	9,023	10,705	11,711	14,316	17%



Once we account for the impact generated in other sectors of the economy, Table 7 shows an even greater growth rate in value added of 17% from 2018-2021, with value added totaling \$14.32 billion in 2021. This figure represents the value added to the U.S. economy (*i.e.*, contribution to GDP) by music streaming and is distinct from the estimated \$12.4 billion in music retail revenue in Figure 2 above attributed to streaming. While revenue represents income receipts, the \$14.32 billion contribution to value is the sum of activity from direct plus adjacent industries that contribute to streaming minus the intermediate inputs.

The \$14.32 million total value added figure compared to direct value added of \$5.4 million implies that for every \$1 in value added that is generated directly through digital music streaming services, an additional \$1.65 in value added is supported in the economy through ripple effects in adjacent sectors in 2021.<sup>22</sup> This multiplier is particularly high when compared to the 1.50 multiplier for the U.S. total music industry,<sup>23</sup> the 2.05 multiplier of the U.S. video game industry,<sup>24</sup> and the 2.32 multiplier in the U.S. electronics manufacturing sector.<sup>25</sup>

Examples of economic activity, supported by digital music streaming, in some adjacent sectors are shown in Figure 5. Programming and Software industries experienced a \$746.5 million contribution to GDP supported by the economic activities related to digital music streaming in 2020. In a similar way, Consulting and Marketing experienced a \$472.3 million contribution to GDP supported by digital music streaming; Other Media experienced a \$440.4 million contribution; and Retail and Merchandise experienced a \$63.9 million contribution in the same year.

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<sup>22</sup> We calculate multiplicative effects by dividing Total Value Added by Direct Value Added for a particular year: *e.g.*, for 2021,  $14,316/5,405 = 2.65 = 1 + 1.65$

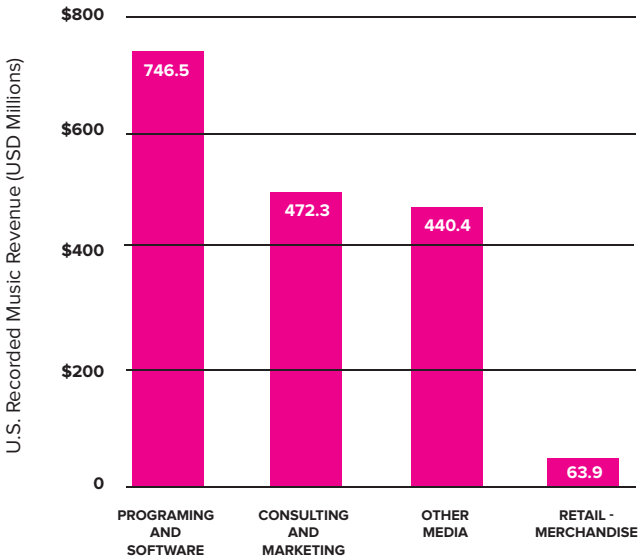
<sup>23</sup> See *The U.S. Music Industries: Jobs & Benefits*, by Robert Stoner and J essica Dutra of Economists Incorporated, prepared for Recording Industry Association of America (RIAA), December 2020, available at [www.riaa.com](http://www.riaa.com).

<sup>24</sup> See *Video Games in the 21st Century: The 2020 Economic Impact Report*, by TEconomy Partners, LLC, prepared for The Entertainment Software Association, available at [www.theesa.com](http://www.theesa.com).

<sup>25</sup> See *The Economic Impacts of the U.S. Electronics Manufacturing Sector*, 2020, available at [www.ipc.org](http://www.ipc.org).

**FIGURE 5: TOTAL VALUE ADDED SUPPORTED BY DIGITAL MUSIC STREAMING IN SELECTED INDUSTRIES, 2020<sup>26</sup>**

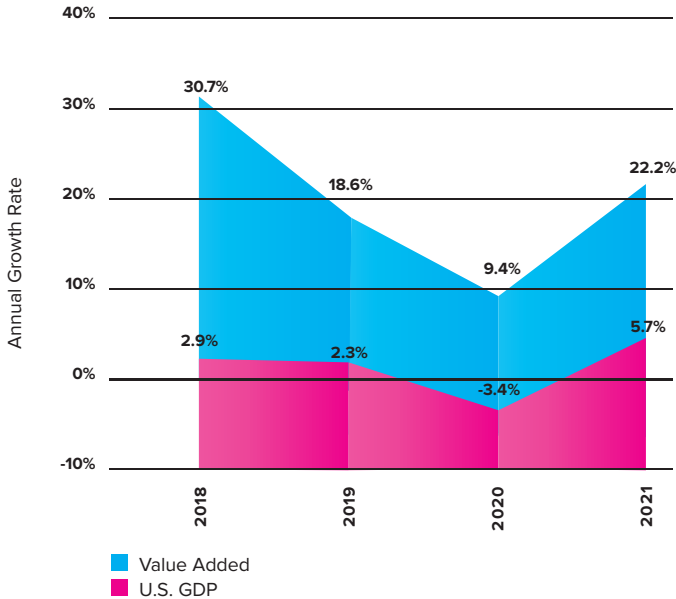
Source: RIAA U.S. Recorded Music Revenue by Format and IMPLAN Multipliers.



Value added by digital music streaming is a particularly important measure of economic impact, as it is effectively a measure of GDP impact and thereby allows us to compare its growth to overall GDP growth. If value added for a particular industry grows faster than GDP, then we can infer that its role in the overall economy has become larger over time.

**FIGURE 6: GROWTH IN U.S. VALUE ADDED SUPPORTED BY DIGITAL MUSIC STREAMING VS. U.S. REAL GDP GROWTH, 2018-2021**

Sources: Federal Reserve Bank of St. Louis - Real Gross Domestic Product (GDPCA), RIAA U.S. Recorded Music Revenue by Format and IMPLAN Multipliers.



<sup>26</sup> Programming and Software includes the following IMPLAN industries: custom computer programming services (459), software publishers (428), computer systems design services (460), and data processing, hosting, and related services (436). Consulting and Marketing includes the following IMPLAN industries: advertising, public relations, and related services (465), management consulting services (462), and business support services (473). Other Media includes the following IMPLAN industries: radio and television broadcasting (431), cable and other subscription programming (432), motion picture and video industries (429), periodical publishers (424), book publishers (425), and newspaper publishers (423). Retail – Merchandise includes the following IMPLAN industries: retail - general merchandise stores (411) and retail - sporting goods, hobby, musical instrument and bookstores (410).

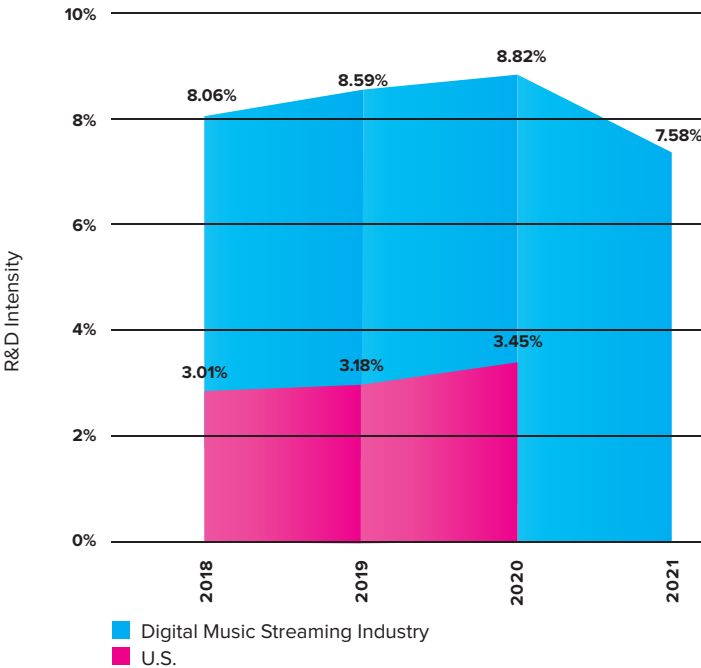
In Figure 6, we compare annual growth in Value Added from digital music streaming to the growth of U.S. Real GDP from 2018-2021. We find that for the entirety of the observed period, digital music streaming has been growing far faster than the general economy.

**RESEARCH AND DEVELOPMENT INTENSITY**

Research and Development (R&D) provides a fundamental force for economic growth, generating value now and in the future. We have analyzed from SEC filings the R&D intensity (*i.e.*, the percentage of revenue spent on R&D) of the major digital music streaming services<sup>27</sup>, and compared that figure to the average U.S. national R&D intensity obtained from the Organisation for Economic Co-operation and Development (OECD). Figure 7 shows that the R&D intensity of the digital music streaming industry is far greater than the U.S. average.

**FIGURE 7: AVERAGE R&D INTENSITY IN THE DIGITAL MUSIC STREAMING INDUSTRY VS. U.S. GROSS DOMESTIC SPENDING ON R&D AS A % OF GDP, 2018-2021**

- Sources:
- 1. Spotify Technology S.A. Form 20-F, 2020 and 2021
  - 2. Sirius XM Holdings Inc. Form 10-K, 2020 and 2021
  - 3. Apple Inc. Form 10-K, 2020 and 2021
  - 4. Alphabet Inc. Form 10-K, 2020 and 2021
  - 5. OECD Data - Gross domestic spending on R&D



<sup>27</sup> The R&D intensity of Spotify, Pandora/Sirius XM, Apple Music, and YouTube Music (as part of Alphabet) were included in the calculation. Amazon Music’s R&D was not included since Amazon does not report detailed R&D expenditures in its annual reports. Amazon reports “Technology and Content,” which includes but it is not restricted to R&D.

## COVID-19 DISCLAIMERS

We are at what hopefully will be the tail end of an unprecedented time in recent economic history due to the COVID-19 pandemic that has affected the economy worldwide. Data used in this study extend through 2021 and show that even though the general economy has been deeply affected by the shut-downs, digital music streaming has withstood the economic pressure very well, continuing to have positive and significant growth, contributing to the overall U.S. economy by supporting jobs, making outsized GDP contributions, among other elements, along with significant R&D investment.

While we cannot make inferences at this point regarding how the digital music streaming industry will perform in the long run, we can certainly observe that in the studied period, digital music streaming has provided a significant lift to the wider economy, especially in terms of value added, and has been increasing its share of overall economic activity in a remarkable way.

## CONCLUSIONS

Digital music streaming has had a transformative effect on the music industry and is now the principal way in which people access and consume music in the U.S. We have analyzed the economic impact of music streaming primarily in the 2018-2021 time-period, but it is clear that streaming has grown strongly for a number of years before that, with particular growth in recent years as streaming became a significant contributor to the U.S. economy.

Digital music streaming's contribution to GDP in the form of value added has been growing faster than U.S. GDP, and thus is occupying a continuously larger share of economic activity. In 2021, digital music streaming contributed \$14.32 billion to the U.S. economy as a whole, and for every \$1 generated in music streaming, another \$1.65 is supported in adjacent sectors, a very significant multiplier effect. Moreover, digital music streaming has generated noteworthy value to the economy via employment and labor income, which have been growing at a rapid rate.

Digital music streaming has also been R&D-intensive, with music streaming platforms having on average invested in R&D at a rate more than two-fold the typical U.S. industry. This record will undoubtedly help pave the way for continued growth in music streaming, together with its economic impact over the longer run.

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